SUPREME COURT, U. S. 71 - 1220

(40498)

MAR 24 1972

IN THE

Supreme Court of the United States

OCTOBER TERM, 1971

No. .....

THE CITY OF NEW YORK,

Petitioner,

—against—

FEDERAL POWER COMMISSION, CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., TOWN OF CORNWALL, VILLAGE OF CORNWALL and PALISADES INTERSTATE PARK COMMISSION,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

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Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

Petitioner prays that a writ of certiorari issue to review the judgment of the United States Court of Appeals for the Second Circuit made and entered on October 22, 1971 in the cause entitled *Scenic Hudson Preservation Conference et al.* v. *Federal Power Commission et al.* in which the City was a petitioner. The City supports the companion petitions being filed on behalf of Scenic Hudson Preservation Conference, The Wilderness Society, The Izaak Walton League of America, National Audubon Society, National Parks and Conservation Association and the Sierra Club and its Atlantic Chapter.

Opinions Below

The project which is the subject of this litigation has twice been licensed by the Federal Power Commission ("F.P.C." or "the Commission"). The 2 to 1 opinion of the Court of Appeals upholding the second license is officially reported at 453 F. 2d 463 (2nd Cir. 1971). It is annexed hereto as "Appendix A" and is referred to herein as *"Scenic Hudson II."* The Court's opinion reviewed and upheld an August 19, 1970 opinion and licensing order (No. 584) of the F.P.C. which is annexed hereto as "Appendix B." The earlier decision of the Second Circuit which set aside the original license and remanded the proceedings to the Commission, *Scenic Hudson Preservation Conference* v. *Federal Power Commission,* 354 F. 2d 608 (2nd Cir. 1965), *cert. denied sub nom., Consolidated Edison Co. of New York* v. *Scenic Hudson Preservation Conference,* 384 U.S. 941 (1966) is referred to herein as *"Scenic Hudson I."* The orders denying rehearing are found in "Appendix C."

Jurisdiction

The judgment of the Court of Appeals was made and entered on October 22, 1971. On November 26, 1971, the Second Circuit by a vote of 4 to 4 denied applications for rehearing in banc which had been timely filed. The time for filing the within petition for certiorari was extended by order of this Court dated February 15, 1972, signed by Associate Justice Thurgood Marshall, to and including March 24, 1972. Jurisdiction of this Court is invoked under Title 28 of the United States Code §1254 (1) and Section 313 (b) of the Federal Power Act, 16 U.S.C. §825 l(b).

Questions Presented

1. Whether a court properly exercises its judicial function when it defers to conclusions reached by a federal regulatory agency in an area in which the agency is without expertise.

2. Whether a final opinion licensing a project, in and of itself, meets the requirement of §102 of the National Environmental Policy Act that an agency prepare an environmental impact statement for each major federal action; and whether §102 requires a meaningful attempt on the part of the licensing agency to consult with other agencies with jurisdiction and/or expertise.

3. Whether Section 27 of the Federal Power Act precluded issuance of a license for this project at the Storm King site.

Pertinent Statutes

The statutory provisions involved are Section 27 of the Federal Power Act, 41 Stat. 1077, 16 U.S.C. §821 (1964), and Section 101 and Section 102 of the National Environmental Policy Act of 1969 ["NEPA"], 83 Stat. 852, 42 U.S.C. §4332 (Supp. 1971). These provisions are annexed hereto as Appendix D.

Statement of the Case

A. Description of the Project

The Storm King project, will be the largest pumped storage facility in the world, capable of producing 2,000,000 kw of electricity. It will use energy generated in off-peak hours (i.e., at night and on weekends) for which there is otherwise no demand, and convert it into energy to meet peak or emergency electrical requirements of the metropolitan New York City area served by Con Edison. For this reason it has been likened to a storage battery, although the analogy does not make clear the fact that, because of frictional losses, more energy is consumed in pumping water to an upper reservoir than is returned to the system by reversing the pump-turbines to generate electricity. For each kilowatt of power produced by the project, 1.4 kw of power will be expended in pumping the water. This fact is significant in assessing the effects of project operation on pollution produced at generating plants used to pump the Storm King project.

As this will be the world's largest pumped storage installation, it is not surprising to note that the elements of the project are indeed massive. Water for operation of the project will be provided by the Hudson River. It will be pumped to a storage reservoir, 1000 feet above the Hudson, through a tunnel 40 feet in diameter and over 2 miles long. The upper storage reservoir, formed by diking in a naturally formed basin behind the mountain, will have 240 acres of surface space. As a consequence, an existing reservoir of the Village of Cornwall will be thereby inundated and destroyed.*

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* In light of the City's long-standing opposition to the Storm King project because of the danger to its Catskill Aqueduct, it is

From the City's point of view, the most disturbing element of the project is the underground powerhouse which will be blasted within the rock of Storm King Mountain. Consisting of three chambers, the powerhouse will be 715 feet long, or the length of 2 football fields stretched from end zone to end zone. A total of 254,000 cubic yards of rock, or some 580,000 tons, will be blasted and removed from the mountain. The largest chamber will be 150 feet high and 78 feet wide, or the height of a modern 15 story building taking up over a third of an average City block. This chamber will be blasted out of the rock only 140 feet away from the Moodna Tunnel Section of the City's Catskill Aqueduct. This Aqueduct furnishes about 40 percent of the City's water supply, and as well provides the water requirements of some 20 upstate communities which by law the City is obligated to supply.

The F.P.C. has taken the unusual precaution of licensing the Storm King project at two sites, both on the west bank of the Hudson River and approximately 40 miles north of New York City. [App. B, ¶335 at 170a]. The primary site ("Storm King site" or "Site 1") is at Storm King Mountain;* the alternate site ("Palisades Park site" or "Site 2"), licensed only if the primary site is overturned by a reviewing court, is some 1½ miles south of Storm King at Crows Nest Mountain and within the Palisades Inter-

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ironic to note that the Village intends to make up part of the resulting deficit in its water supply by tapping the City's Catskill Aqueduct.

* Part of this land was conveyed by the City to the Palisades Interstate Park Commission in 1963. The deed provides that the land shall be used for park purposes only, and contains a restrictive covenant barring drilling at depths greater than 200 feet from the surface.

state Park.* Except as otherwise noted, the discussion herein is limited to the Storm King site.

B. Reasons for the City's Opposition

A pumped storage facility has obvious benefits not only for Con Edison but for its major area of service, New York City. It is impossible to conceive of a viable future for the City whether as a hub of business and industry, or as a cultural center, or as a major residential community without an adequate and reliable supply of electricity. And it is undisputed that the project is a means of bringing additional peaking power and reliability to the Con Edison system. In light of these facts, it is obvious that the City's opposition would not be, and is not, lightly undertaken.**

1. *The Aqueduct*

The primary reason for the City's opposition to the project is its concern for the safety of its water supply. This concern is caused by the fact that the massive powerhouse previously described will be excavated only 140 feet from the Moodna Tunnel Section of the City's Catskill Aqueduct.***

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* Rejected by both the Commission and the Hearing Examiner was a third site, also within the Palisades Interstate Park, referred to as "Site 2A" or "Site 2CT." It is not discussed herein.

** In 1966, after Con Edison had changed its plans for the project in order to avoid the possibility of danger to the Aqueduct, the City voiced its support of the project (contingent upon Con Edison's ability to meet objections concerning the possible destruction of marine life and the impairment of the natural beauty of the area) in a Memorandum of Understanding with the utility.

*** The City's concern about damage to its Aqueduct caused by the project dates back to 1963 when the project was first proposed. The powerhouse would have been partially above ground and there would have been an excavation far smaller than that now pro-

The importance of the Catskill Aqueduct to the City's water supply system must not be underestimated. Except for a portion of Queens, all of the City's water supply is carried into the City from upstate watershed areas. The Catskill, one of the three water systems, supplies approximately 40 percent of the City's water requirements. While for most of its length the Catskill Aqueduct is "cut and cover" (i.e., a concrete tunnel covered by earth conveying the water by gravity), in order to cross the Hudson River at Storm King Mountain it becomes a series of pressure tunnels known collectively as the Moodna-Hudson-Breakneck Pressure Tunnel. The Moodna section is the west bank portion of tunnels which convey the water in an easterly direction from the surface until, by a series of drops, it reaches a point 1,111 feet below sea level, where the water enters the Hudson tunnel and crosses to the east bank of the river. When it was first constructed in 1913, the Moodna Tunnel section consisted primarily of a long, gradually descending tunnel from which the water fell to the Hudson Tunnel in one precipitous drop. However, the last 900 feet of the Moodna Tunnel had to be abandoned because it had broken and was leaking. To correct the situation, the Supplementary Moodna Tunnel was sunk 400 feet beneath the

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posed 175 feet away from the Aqueduct. As a consquence of the City's objections, Con Edison changed the plans in order to avoid interference with the Aqueduct. After the remand in *Scenic Hudson I* Con Edison decided to put the powerhouse entirely underground, thereby bringing the powerhouse within 140 feet of the Aqueduct. This of course was far worse from the standpoint of possible damage to the Aqueduct than the original proposal that was opposed in 1963. In October 1968, after negotiations with the company to relocate the project had failed the City petitioned to intervene before the F.P.C. The petition was granted and the record was reopened to consider the issues of danger to the Aqueduct and possible alternate sites.

900-foot portion which had failed, and as a result today the water reaches the Hudson Tunnel by two drops rather than the original one drop. Operation was resumed in 1918 and the tunnels have been in constant use since then. Needless to say, with each passing year the City has become increasingly dependent on the Catskill Aqueduct to help meet its water requirements. It is that portion of the Moodna Tunnel which immediately precedes the 900 foot portion which failed and was hence abandoned, which will be only 140 feet away from the massive powerhouse excavation. At this point the tunnel is 14 feet in diameter.

The City's concern for the safety of its Aqueduct is based upon several interrelated factors. First, there is the fact that the evidence is uncontradicted that excavation of the powerhouse will cause stress changes in the rock of Storm King Mountain. What those stress changes will be and what effect they will have is unknown and a subject of controversy among experts.

Second, there is the fact that the present condition of the Moodna Tunnel is unknown. The tunnels have been in constant use since 1918. Thus no one: not the City, not the F.P.C., not Con Edison—knows the present condition of the Moodna tunnel. All that is known is that the tunnel continues to operate. It is probable that even though the tunnel was sunk with the greatest care, cracks and fissures, masked by the constant hydrostatic pressure, have developed. But the number and extent of these faults, if any, are simply not known and thus no one can judge how the Aqueduct will react to changes in stress in the surrounding rock caused by the massive powerhouse excavation.

Finally, there is the historical evidence that the rock in the area of the proposed powerhouse excavation is under

high stress, prone to stress relief and consequently unstable. Although Storm King Mountain is generally sound rock—indeed this is why it was chosen as the Aqueduct crossover point—two facts concerning the area of excavation indicate lack of homogeneity and instability: first, failure of the last section of the Moodna Tunnel (now replaced by the Supplementary Moodna Tunnel) which occurred at the depth of the portion still in use, and which was attributed in part to stress relief; and, second, the incidence of "popping" (spontaneously scaling) rock in excavation of the access shaft to the Supplementary Moodna Tunnel.

In light of these factors—the fact that stress relief will occur; the fact that the condition of the Moodna Tunnel is unknown; and the fact that there is historical evidence of stress relief and hence instability of rock in the area of the powerhouse excavation—it is the judgment of the engineers entrusted with the safety of the water supply that the risk of damaging the 14 foot diameter Aqueduct tunnel, which carries 40 percent of the City's daily water supply, caused by an excavation only 140 feet away and resulting in the removal of 580,000 tons of rock should not be taken.

2. *Increased Air Pollution*

The City is further opposed to this project because it will cause increased air pollution in the City even though the City cannot now, and will not for the foreseeable future, be able to meet acceptable air quality standards. Even after this was pointed out, the F.P.C. refused to require that the energy used to pump Storm King originate outside New York City.

The Commission has asserted that the plant will contribute to the abatement of air pollution in the City,* based on its assumption that "very little" City generated power will be used to pump the project [Appendix B, ¶83, at 91a-92a]. Unfortunately this assumption is baseless both in the record and in the "economic realities" supposedly relied on. The facts are that retirement of Con Edison's older, inefficient plants is not tied to this project; that it is more economical (and efficient) for Con Edison to run its generating plants in the City around the clock than to buy power; that Con Edison's nuclear capacity is too small and unreliable to pump this project for the foreseeable future; and that even Con Edison's most efficient conventional generating units cause substantial pollution, particularly in light of shortages of low sulfur fuels and natural gas for industrial purposes.

3. *Damage to the Hudson Highlands*

The City also opposes this project because the unique scenic beauty and other natural resources of the area have not been safeguarded. This fact assumes particular importance because this largely unspoiled area is unique in its close proximity to a major metropolis.

C. The Court of Appeals Opinion

By a 2 to 1 decision, the Court of Appeals approved the F.P.C.'s grant of a license for the Storm King project. Writing for the majority, Judge Hays found: compliance with the Court's earlier remand in *Scenic Hudson I;* sub-

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* For a time this misapprehension was shared by the City. See, e.g., its 1968 Petition to Intervene.

stantial evidence supporting the F.P.C.'s conclusions; and compliance with applicable statutes.* [App. A at 7a].

On the issue of danger to the City's Aqueduct, the majority found that §27 of the Federal Power Act did not preclude licensing the Storm King project; that in any event, §27 protected only the right to compensation for holders of state-conferred water rights; and that the Commission's finding that the remoteness of probability of damage to the Aqueduct was supported by substantial evidence. [App. A at 31a-35a]. The Court never considered the City's objections to the F.P.C.'s analysis of the air pollution consequences of the project, but merely summarized the F.P.C.'s findings. [App. A at 19a-20a]. The Court further found that NEPA applies to this proceeding, and that the procedural requirements of §102 of that Act were met by the F.P.C.'s requests for comments and by its final opinion. [App. A at 36a-38a].

Judge Oakes dissented. He found that the F.P.C. although purporting to follow the mandate of *Scenic Hudson I*, had actually acted arbitrarily and capriciously in licensing the project. Since he found that the F.P.C. had twice failed in its obligation to analyze and consider all aspects of the license for the Storm King project, Judge Oakes recommended that there would be no useful purpose in further remand and that consequently the F.P.C. should be reversed.

Specifically he was particularly disturbed that the F.P.C. had decided the Aqueduct issue without benefit of relevant expertise and contrary to the recommendations of its staff.

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* Only those areas of the decision specifically raised by this petition will be discussed herein.

[App. A at 47a]. In commenting that the F.P.C.'s findings as to the Aqueduct while contradictory and insufficient nevertheless showed that the project does present a risk to it, he noted:

> " . . . there is a world of difference between *no* danger and a 'remote' danger. If a danger is 'remote' the degree of remoteness assumes importance in proportion to the magnitude of the danger. Here the danger is obviously great, and there is no finding as to the degree of remoteness." [App. A at 49a] (Emphasis in original)

Furthermore he found that the F.P.C. had misconstrued the burden of proof, noting that it was not the City's task to show that the Aqueduct would break, but rather, Con Edison's burden to prove and the F.P.C.'s task to find that the project would not endanger the public health, life and property. [App. A at 49a].

Judge Oakes was also disturbed by the Commission's conclusions on the air pollution consequences of the project, finding them to be incomplete and insufficient. He found that by failing to require that pumping energy originate outside the City, the F.P.C. had failed in its statutory responsibility to avoid adding to air pollution. [App. A at 54a]. Finally, with respect to NEPA he found that there had in fact been no compliance with the statute. [App. A at 57a-61a].

Because the judges of the Second Circuit were evenly divided, a petition for rehearing in banc was denied. Judge Timbers filed a written dissent.

Reasons Why the Writ Should Be Granted

The F.P.C. has concluded that this project will neither cause the Aqueduct to break nor cause increased air pollution in New York City. Should such conclusions be wrong in law and in fact, as the City contends, the health and safety of at least 8.5 million people will have been wrongfully put in jeopardy. For this reason alone, apart of the errors specifically discussed below, this petition presents an important question which should be decided by this Court.

Additionally, this petition affords the Court an opportunity to speak definitively as to what constitutes compliance with NEPA.

Finally, this case requires interpretation of §27 of the Federal Power Act arising in a novel fact situation, but one to which the section clearly applies.

POINT I

The failure of the Court below to recognize the Commission's lack of expertise resulted in erroneously limiting the scope of its review.

In *Scenic Hudson II*, the Court was reviewing the license for the Storm King project for the second time. While the role of the reviewing court after remand is no different from that of the reviewing court in the first instance, the very fact of remand in this and similar cases* points up

* For example, failure to consider environmental impact has been adjudged an element requiring remand. See, e.g., *Udall* v. *F.P.C.*, 387 U.S. 428 (1966). Cf. cases remanded for failure to comply with NEPA, e.g., *Greene County Planning Board* v. *F.P.C.* (Docket Nos. 71-1991, 71-1996, 2nd Cir., 1972); *Ely* v. *Velde*, 451 F.2d 1130 (4th Cir., 1971); *Lathan* v. *Volpe*, 3 ERC 1362 (9th Cir., 1971).

the fact that the record developed by the agency has been found to be lacking in areas where the agency may have some peripheral experience with the field, but no expertise in it. It is submitted that in such a case, the court must be especially careful not to let mere length of the record substitute for meaningful consideration of the issues raised, for to hold otherwise would cause remand to be a vain gesture, resulting only in delay.

The issue squarely raised by the decision in *Scenic Hudson II* is: can a court properly defer to agency expertise when the agency is called upon to make judgments in areas where it is not expert? It is submitted that petitioners in *Scenic Hudson II* did not, as the Court alleged, urge a "new standard of judicial review," [App. A at 10a], but rather they sought to assure that the findings of the Commission would be subject to searching and careful judicial review mandated by the Administrative Procedure Act.

Although the Federal Power Act specifically provides that findings of the Commission as to facts where supported by substantial evidence shall be conclusive, [§16(b), 16 U.S.C. §825 1 (b) (1964)], this provision does not preclude the applicability of the Administrative Procedure Act. *Citizens to Preserve Overton Park, Inc.* v. *Volpe,* 401 U.S. 402, 410 (1971). Indeed in all cases where judicial review is permitted, the administrative action must be reviewed to determine whether it was "'arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law' or if the action failed to meet statutory, procedural, or constitutional requirements." *Id.* at 413-14 citing §10(e) of the Administrative Procedure Act, 5 U.S.C. §706 (2) (A) (B) (C) (D) (Supp. V). And even though agency action often involves areas of specialization committed by Con-

gress to the jurisdiction of that agency, the court would be derelict in its duty if it failed to study the evidence on technical and specialized matters to determine not only whether the agency's findings are supported by substantial evidence, but also whether it has exercised "a reasoned discretion." *Greater Boston Television Corp.* v. *F.C.C.*, 444 F. 2d 841, 850 (1970), *cert. denied* 403 U.S. 923 (1971).

However, the scope of such review is narrow, since within an agency's area of expertise the courts will ordinarily defer to an agency's expert judgment, even where the court might justifiably have chosen differently had it determined the issue *de novo*. *Universal Camera* v. *N.L.R.B.*, 340 U.S. 474, 488 (1951). See also *Citizens to Protect Overton Park, Inc.* v. *Volpe, supra*, at 416.

The Court in *Scenic Hudson II* after reciting the evidence concerning danger to the City's Catskill Aqueduct (consisting solely of conflicting expert opinion), stated:

> "It is clear that the resolution of highly complex technological issues such as these was entrusted by Congress to the Commission and not to the courts. Where the Commission's conclusions are supported by substantial evidence, the Courts *must* accept them. [App. A at 34a] (Emphasis supplied)."

It is submitted that this statement is erroneous in concept as well as in fact.

A. The Danger to the Aqueduct Is Not a Highly Complex Technological Issue Entrusted by Congress to the F.P.C.

Merely because the question of danger to the Aqueduct from excavation of the Storm King project is a "highly complex technological issue" does not necessarily put it within the purview of the F.P.C.'s area of expertise. It involves two highly complex areas of expert judgment: the nature and effect of stress relief in rock and the evaluation of a risk presented to a water supply system.

The F.P.C. has been adjudged expert in many areas *directly related to the regulation of conventional sources of energy.** But, as Judge Oakes cogently pointed out in his dissent, while the F.P.C. may have some familiarity with geology, its general familiarity does not constitute expertise on the effects of stress relief on aqueduct pressure tunnels in rock. Furthermore, whatever expertise it did have was ignored: the Commission overrode the recommendation of its own staff that some precautionary measure be taken to protect the Aqueduct.** [App. A at 47a].

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* Thus for example it has been held to be expert in resolving highly complex issues of natural gas rate regulation [*Permian Basin Area Rate Cases*, 390 U.S. 747, 767 (1968)]; in hydraulic engineering [*United States ex rel. Chapman* v. *FPC*, 191 F.2d 796, 808 (4th Cir. 1951)]; in determining the necessity and condisions of interconnections between electric utilities [*Gainesville Utilities Dep't* v. *Florida Power Corp.*, 402 U.S. 515 (1971)]; and, in the flow of electricity within a transmission line [*F.P.C.* v. *Florida Power & Light Co.*, 40 U.S. Law Week, 4141, 4145 (1972)].

** It must be noted that the City opposed the two precautionary measures considered—building a bypass or lining the Moodna Tunnel with steel—because of the extensive shutdown of the Aqueduct required and the resulting risk to the water supply and to the integrity of the Aqueduct.

Had the procedures of NEPA been complied with, the Court might have had more cause for comfort in relying upon the F.P.C.'s determination. It is possible that in the circulation of the required environmental impact statement there could have resulted some relevant analysis of the evidence by an agency of government with expertise (e.g., the Bureau of Mines). But all that we have here is a bare assertion by a federal agency which, in the name of electric power as being the "lifeline of the city" [App. B, ¶53, at 81a] has abrogated to itself an expertise, which it plainly does not have, and puts 40 percent of the City's water supply in jeopardy. This point is most clearly underscored by the Commission's licensing of the alternate Palisades Park Site *without any investigation as to its geological feasibility or as to the subsurface conditions.* [App. B, ¶317 at 165a]. Furthermore, not only are the F.P.C.'s findings as to the danger internally inconsistent (see the discussion in Judge Oakes' dissent, App. A at 47a-50a), but they miss the essential point that the question is not one of whether a risk exists but rather the judgment as to whether the risk should be taken at all. Again, this requires an expertise—this time in matters of water supply —which the Commission clearly does not have.

B. The Extent to Which a Reviewing Court Must Defer to Agency Expertise

The City is not urging that because 40 percent of its water supply is at stake, it thereby has the right to "veto" this project. *Scenic Hudson II,* App. A at 34a-35a citing *First Iowa Hydro-Electric Coop.* v. *F.P.C.,* 328 U.S. 152, 164 (1946). Rather, it urges that a reviewing court may not, simply because highly complex and technological issues are at the crux, abdicate its role of review by hiding

behind the veil of agency expertise, particularly where that expertise is not relevant to such issues. It does not urge a new standard of review, or a higher burden of proof. The City simply asks the courts to recognize the undeniable fact that agencies are not necessarily expert in all aspects of the decisions they are called upon to make, and that where an agency has no particular expertise (and hence where the reviewing court is not justified in deferring to the agency), the court may not stop at the determination of substantial evidence, but must probe further to determine whether the agency has exercised the "reasoned discretion" demanded of it. *Greater Boston Television Corporation* v. *F.P.C., supra.*

While there is no ruling directly on point, it is submitted that the treatment of agency expertise by the courts has constituted a *de facto* recognition of this distinction. Consequently, the extent to which the courts must defer to agency expertise has been narrowly construed. Thus in the *Florida Light and Power* case, this Court said in speaking of the nature of the flow of electricity in a transmission line:

> "Particularly when we consider a purely factual question within the area of competence of an administrative agency created by Congress, and when resolution of that question depends on 'engineering and scientific' considerations, we recognize the relevant agency's technical expertise, and defer to its analysis unless it is without substantial basis in fact." *Supra* at 4144.

This statement must be contrasted with the case at Bar which does not involve "purely factual question[s] within the area of competence" of the F.P.C., but revolves around

matters about which the F.P.C. does not have relevant technical expertise and its experience is at best limited. Moreover, lacking such expertise, the F.P.C. nevertheless chose to ignore the urgings of its own staff.

Where 40 percent of the water supply of the nation's largest city is at stake, and where the F.P.C.'s decision as to a source of additional electric power for that city must necessarily involve a judgment as to the safety of that water supply, it is submitted that it is especially important that a reviewing court take a hard look at the Commission's conclusions to determine whether they constituted an abuse of discretion or were arbitrary and capricious, lest expertise become "a monster with no practical limits on its discretion." *Burlington Truck Lines* v. *U.S.*, 371 U.S. 156, 167 (1962).

It is submitted that in areas outside an agency's expertise, the courts are not to be reduced to mere "rubber stamps" but rather, as this Court said in the context of statutory interpretation, in such areas the courts would "abdicate their responsibility" if they did not, in addition to finding substantial evidence, determine whether a reasoned discretion had been exercised, *N.L.R.B.* v. *Brown*, 380 U.S. 278, 291 (1965); *Greater Boston Television Corp.* v. *F.C.C.*, *supra*.

POINT II

The Court below erred in finding compliance with NEPA.

The Storm King project, as a major federal action licensed after January 1, 1970, must comply with the requirements of the National Environmental Policy Act, 42 U.S.C. §4321 et seq. (Supp. 1971). [App. A at 36a]. Those requirements are set out in §102 of the Act which in part (C) provides that for each major federal action a federal agency must, *prior* to making the detailed environmental impact statement required by the Act, confer with and get the opinions of other federal agencies, having jurisdiction or expertise, on the possible environmental consequences of that action. In *Scenic Hudson II* the Court below found that there had been compliance with the mandates of §102 and the Act as a whole. [App. A at 37a-38a]. It is submitted, as demonstrated below, that the Court erred in so finding.

A. The Commission's Final Opinion Was Not a Sufficient Environmental Impact Statement

It was specifically found by the Court below that the Commission's opinion constituted the environmental impact statement required by NEPA. [App. A at 38a]. It is submitted that this finding was not only in error but that it is in conflict with a later decision by a different panel of the same circuit court, *Greene County Planning Board* v. *F.P.C.*, Docket Nos. 71-1991, 71-1996, 2nd Cir., Jan. 17, 1972.*

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* The F.P.C. has petitioned for rehearing in banc, alleging that a conflict exists between *Greene County* and *Scenic Hudson II*.

While the facts in the case at Bar and in the *Greene County* case differ—in the former hearings were completed as of the effective date of NEPA, whereas in the latter hearings are still in progress—they share a common element: the F.P.C.'s contention that NEPA's requirement for an environmental impact statement prepared by the licensing agency can be satisfied by the Commission's final order. In *Greene County* this contention was rejected by the reviewing court on the ground that §102 of NEPA specifically requires that the agency's own impact statement accompany a proposal through the existing agency review process.

It is conceded that in the case at Bar at the effective date of NEPA the review process was all but complete, since all that remained undone was the Commission's own decision. Yet it is submitted that by postponing the impact statement to the *final* agency procedure, the F.P.C. effectively circumvented a fundamental purpose of NEPA: that the licensing agency review the expert comments of other federal agencies prior to a final evaluation of a project's environmental impact.

B. The Commission's Consultations With Other Agencies Failed to Meet the Requirements of NEPA

It was further found by the Court below that the Commission had met the §102 requirement that a licensing agency, prior to making its detailed environmental impact statement, consult agencies with expertise or jurisdiction over possible environmental impact. It is submitted that at least insofar as the issues of danger to the Catskill Aqueduct and air pollution consequences of the project are concerned, the Court was in error in so finding because the few

consultations which did take place were inadequate to assess the scope of the project's impact, and in any event failed to take into account recent developments.

As to the issue of danger to the Aqueduct, the only comments which might possibly have had relevance were made by the Army Corps of Engineers in 1963 and 1964. These comments were made *before* project plans were changed so as to locate the powerhouse underground, and in any event concerned only the navigational impact of the project. It is therefore apparent that the F.P.C. relied entirely on its own judgment in evaluating the risk presented to the City's water supply.

With respect to the issue of the air pollution consequences to New York City of project operation, the Commission had found the following: that the project would permit retirement of Con Edison's older, inefficient plants; that the project would be pumped primarily by energy from non-polluting sources outside the City; that to the extent in-City pumping power was used, this would be from Con Edison's more efficient generating units using relatively pollution-free fuels. On this basis, it was concluded that the Storm King project would have air pollution benefits for the City. This analysis was not questioned in the majority opinion below. [App. A at 20a].

In its petition for rehearing (and subsequently in its briefs before the Court) the City pointed out the inadequacies and inaccuracies of the foregoing analysis. In particular it noted that the F.P.C. should have known from Con Edison's 10 Year Plan, filed with the Commission, that retirement of Con Edison's older, inefficient plants is not linked to the Storm King project. It was shown that the

Commission's confidence that the project would be pumped by energy from non-air-polluting sources outside the City was misplaced since for the foreseeable future Con Edison's nuclear capacity will be too small and unreliable to pump this project. Furthermore, the "economic realities" (supposedly relied on by the Commission in its analysis) do not support its conclusion that power generated outside the City will be used, since Con Edison's conventional generating capacity outside of the City will be similarly limited, and those "realities" actually dictate that it is cheaper to run conventional generating plants in New York City around the clock than to buy power. Nor, as it was further pointed out, is there comfort if only Con Edison's more efficient units are used because even these generate substantial amounts of pollution and will be creating it at a time when there is the least likelihood of dispersion.* Moreover, the least polluting fuels—low sulfur content oil and natural gas—are in short supply. Finally, it was shown that the Commission did not consider pollution from particulates or nitrogen oxides, and the Commission's analysis of pollution from sulfur dioxide was clearly inadequate.

It is submitted that had the F.P.C. solicited the comments of other agencies (e.g., the National Air Pollution Control Administration, "NAPCA") prior to issuing its opinion, at least some of these errors might have been noted. In any event, at the least the Commission might have been better

* Pumped storage projects utilize off-peak hour pumping energy. As a rule this means that the energy used to pump water will be generated during the late evening and early morning hours. While these hours are optimum from an economic point of view, they are the *worst* from the standpoint of air pollution because the stillness of the air at these hours decreases the likelihood of dispersing the pollutants.

able to evaluate the consequences of project operation on the basis of current data showing the severe air pollution problem in New York City, and in particular the City's difficulty in meeting the air quality criteria which had been proposed by NAPCA. The only "consultation" on air pollution which appears in the record—the testimony of an employee of the Public Health Service in 1967—was clearly inadequate to aid the Commission in assessing the present-day consequences of the project.

Among the purposes of NEPA are assurance of "safe, healthful surroundings" and attainment of the widest range of beneficial uses of the environment without "risk to health or safety". [42 U.S.C. §4331(b)(2), (3)]. It is submitted that this project insofar as it endangers the safety of the water supply of 8.5 million people and will cause increased air pollution in the already dirty atmosphere of the City where these people live and work, presents the kind of risk to health and safety NEPA was designed to avoid. At the very least, the consultation required by NEPA might have resulted in a provision, advocated by the City, that Con Edison be banned from using City-generated power to pump the Storm King project. Minimally, relevant expertise should have been applied to the problems of the risk to the water supply and air quality of the nation's largest city.

In *Calvert Cliffs' Coordinating Committee* v. *A.E.C.*, 449 F. 2d 1109 (D.C. Cir., 1971), the Court found that the procedural requirements of NEPA are "not discretionary", but in fact "establish a strict standard of compliance", which is not substantially altered by the phrase "to the fullest extent possible." *Id.* at 1112. It is submitted that the case at Bar dramatically points up the fact that unless the procedural requirements of NEPA are followed—including

consultation with other agencies—the purpose of NEPA will be effectively thwarted.

POINT III

This license is precluded by Section 27 of the Federal Power Act.

The words of Section 27 of the Federal Power Act are clear and unequivocal:

> *"Nothing contained in this Chapter shall* be construed as affecting or intending to affect or *in any way interfere with the* laws of the respective States relating to the *control,* appropriation, use, or distribution *of water used . . . for municipal* or other *uses,* or any vested right acquired therein." 16 U.S. C. §821. (Emphasis supplied.)

It is submitted that the Court below was in error when it determined that §27 did not preclude the license for the Storm King project. It was also in error in holding that the "only purpose" of §27 is to preserve the right to compensation for holders of state-conferred water rights. [App. A at 31a-32a].

A. Section 27 Is Applicable to This License

One need not go beyond a plain reading of the statute to determine that §27 is applicable to this license. By state law there is imposed upon the City responsibility for meeting the water requirements of New York City, as well as for making available water from its supply system to communities in certain upstate counties. It is submitted that when, despite its concession that the project would present some risk to the Catskill Aqueduct, the F.P.C. issued

the license for the Storm King project in disregard of the City's objections, the F.P.C. was interfering with the City's control of water used for municipal uses, thereby bringing this case squarely within the language of §27. The type of control here referred to is perhaps best illustrated by the restrictive covenant in the deed by which the City conveyed the land above the Aqueduct to the Palisades Interstate Park Commission. That covenant bans drilling at depths greater than 200 feet from the present surface, thereby leaving a rock cover of over 200 feet to protect the Aqueduct.

B. Relief Under §27 Is Not Limited to Compensation for State-Conferred Water Rights

The statement of the Court below that §27 protects only the right to compensation for state-conferred water rights quotes *dictum* from an opinion of the Ninth Circuit, *Portland General Electric Co.* v. *F.P.C.*, 328 F. 2d 165, 176 (9th Cir. 1964). This dictum in turn is based upon two decisions of this Court construing §8 of the Reclamation Act (43 U.S.C. §383). Whether the Ninth Circuit is correct in so interpreting §8 of the Reclamation Act is not at issue here. But from the history of §27 of the Federal Power Act what is certain is that relief under this section has not been limited to money damages. Thus in the case of *Henry Ford and Son, Inc.* v. *Little Falls Fibre Co.*, 280 U.S. 369 (1930), this Court affirmed a New York State judgment granting damages *and* permanent injunctive relief. This duality of relief was specifically recognized by this Court in *F.P.C.* v. *Niagara Mohawk Power Corp.*, 347 U.S. 239, 254 (1954).

While it is therefore clear that relief under §27 is not, as the Ninth Circuit erroneously concluded, limited solely

to compensation for state-conferred water rights, the cases decided under §27 are generally not helpful in applying §27 to the facts in the case at Bar, because such cases construe only the second of the two situations saved from federal supersedure by §27—cases dealing for the most part with vested rights in water.

However, the statute on its face clearly presents *two* categories of laws affecting rights in water which are saved from the operation of the Federal Power Act. The first category is concerned with the "control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses"; the second with vested rights in the water. By using the disjunctive "or", Congress was clearly differentiating between the two categories: one dealing with water used for municipal or irrigation or similar purposes, and the other covering vested rights in water. The absurdity of concluding that Congress meant monetary compensation to be the only remedy for interference with the first category of rights is shown by the application of that formula to the facts in the case at Bar. Of what value would it be to New Yorkers deprived of a substantial portion of their water to know that Con Edison must compensate the City for the cost of repairs to the Aqueduct? That Congress intended to encompass something more than the Ninth Circuit's determination as to the intent of §27 is obvious from the fact that §10(c) of the Federal Power Act, [16 U.S.C. §803(c)] specifically provides that licensees are liable for damages caused by a project.

The only case construing §27 not dealing with vested rights in water is *First Iowa Hydroelectric Coop.* v. *F.P.C.*, *supra*. It is urged that that case is not directly in point because basically it involved a state's attempt to require the receipt of a state permit as a condition precedent to

a federal license. This Court held that such an interpretation of §9(b) of the Federal Power Act [16 U.S.C. §802 (b)] would result in the state having a veto power over a federal licensing procedure, and as a consequence, the state statute requiring such permit was not saved by §27.

The City's rights to control its supply system and its Aqueduct cannot be compared with the duplicative licensing procedure sought to be superimposed by Iowa. The City is not setting up a procedure to be superimposed upon the federal licensing process, but rather is merely trying to protect rights and obligations, created pursuant to a state law specifically exempted by §27, which rights and obligations existed prior to the federal license being issued. Whether or not Congress envisaged facts comparable to those here, it seems clear from the wording of the statute that Congress did not intend that the navigable waters of the United States be developed for power if doing so meant risking a water supply system. It is submitted that where the country's navigable waters cannot be developed for power save at the expense of a water supply system, §27 precludes licensing such a power project.

CONCLUSION

The petition for a writ of certiorari should be granted.

March 24, 1972

Respectfully submitted,

J. Lee Rankin,
Corporation Counsel of the
City of New York,
Attorney for Petitioner.

Peter C. Demetri
Evelyn J. Junge,
of Counsel

APPENDICES

APPENDIX A

Opinion of the United States Court of Appeals for the Second Circuit, Dated October 22, 1971

UNITED STATES COURT OF APPEALS

FOR THE SECOND CIRCUIT

Nos. 1033-1038—September Term 1970.

(Argued June 9, 1971 Decided October 22, 1971.)

Docket Nos. 35678, 35676, 35677, 35683, 35688, 35689

SCENIC HUDSON PRESERVATION CONFERENCE, PALISADES INTERSTATE PARK COMMISSION, CITY OF NEW YORK, THE SIERRA CLUB AND ITS ATLANTIC CHAPTER, THE WILDERNESS SOCIETY, THE IZAAK WALTON LEAGUE OF AMERICA, NATIONAL AUDUBON SOCIETY AND NATIONAL PARKS AND CONSERVATION ASSOCIATION,

Petitioners,

v.

FEDERAL POWER COMMISSION,

Respondent,

and

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., TOWN OF CORNWALL AND VILLAGE OF CORNWALL,

Intervenors.

Before:

FRIENDLY, *Chief Judge,*
HAYS and OAKES, *Circuit Judges.*

Petitions for review filed pursuant to Section 313(b) of the Federal Power Act, 16 U.S.C. §825(b) (1964) seeking to set aside an order of the Federal Power Commis-

sion granting a license to Consolidated Edison Company of New York, Inc. to construct a pumped storage power plant on the Hudson River.

Petitions denied.

LLOYD K. GARRISON (Albert K. Butzel, Paul Weiss, Goldberg, Rifkind, Wharton & Garrison, New York, N.Y., on the brief), *for Petitioner Scenic Hudson Preservation Conference.*

PHILIP WEINBERG, Ass't Attorney General (Louis J. Lefkowitz, Attorney General of the State of New York.

SAMUEL A. HIRSHOWITZ, First Assistant Attorney General, Cyril H. Moore, Jr., Assistant Attorney General, on the brief), *for Petitioner Palisades Interstate Park Commission.*

EUGENE MARGOLIS (J. Lee Rankin, Corporation Counsel, City of New York, Evelyn Junge, on the brief), *for Petitioner City of New York.*

LLOYD K. GARRISON (David Sive, Sigmund Anderman, Bertram Braufman, Winer, Neuburger & Sive, New York, N.Y., on the brief), *for Petitioner The Sierra Club and its Atlantic Chapter.*

LLOYD K. GARRISON (James Marshall, Henry Winestine, Marshall, Bratter, Greene, Allison & Tucker, New York, N.Y., on the brief), *for Petitioner The Wilderness Society.*

LLOYD K. GARRISON (Angus Macbeth, John H. Adams, National Resources Defense Council, Inc., on the brief), *for Petitioners Izaak Walton League of America, National Audubon Society and National Parks and Conservation Association.*

GORDON GOOCH, General Counsel (J. Richard Tiano, Assistant Solicitor, Leonard D. Eesley, Assistant General Counsel, John D. Lane, Raymond E. Hagenlock, Charles K. Barrow, Attorneys, Federal Power Commission, Washington, D.C., on the brief), *for Respondent.*

CAMERON F. MACRAE (Carl D. Hobelman, G. S. Peter Bergen, Sheila H. Marshall, Jeffrey E. Silver, LeBoeuf, Lamb, Leiby & MacRae, New York, N.Y., on the brief), *for Intervenor Consolidated Edison Company of New York, Inc.*

JAMES R. LOEB, Rider, Weiner & Loeb, Newburgh, N.Y., on the brief, *for Intervenor Town of Cornwall.*

HAYS, *Circuit Judge:*

By Opinion No. 584, dated August 19, 1970, the Federal Power Commission granted a license to Consolidated Edison Company of New York, Inc., to construct, operate, and maintain a pumped storage project along the western shore of the Hudson River at Cornwall, New York. Eight parties[1] have filed petitions pursuant to Section 313(b) of

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1 All of the petitioners except Palisades Interstate Park Commission object to the licensing order of the Federal Power Commission in toto. The Palisades Interstate Park Commission opposes only the site 2 alter-

the Federal Power Act, 16 U.S.C. §825 *1*(b)(1964) seeking to set aside this order on various grounds. The issues raised by these petitions are both complex and important, involving, as they do, the conflict between the needs of a highly technological society and the increased awareness of environmental considerations.

The opinion and order of the Federal Power Commission presented here for review follow by five years the earlier remand by this court in *Scenic Hudson Preservation Conference* v. *Federal Power Commission*, 354 F.2d 608 (2d Cir. 1965), *cert. denied sub nom., Consolidated Edison Co. of New York* v. *Scenic Hudson Preservation Conference*, 384 U.S. 941 (1966), in which the petitions challenged three 1965 orders of the Commission licensing the project and refusing to reopen proceedings and take additional evidence on various issues. In the intervening period extensive hearings have been held, two decisions have been rendered by a Hearing Examiner and the Commission has issued its own opinion.

The new proceedings have produced a project that is different in some ways from the project that was before this court in 1965.

The functional elements of the project remain the same. It is still to be the largest pumped storage plant in the world and its principal function, to provide energy for peak load periods, is unchanged. The proposed location is the same as that previously proposed, the Hudson River at approximately river mile 56.5, about 40 miles north of

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native which calls for the location of the powerhouse within Palisades Interstate Park. The objection of petitioner City of New York is based on the aqueduct and air pollution question alone. The Izaak Walton League of America rests its objection primarily on the fisheries question and other environmental factors. All other petitioners raise virtually all the issues discussed in this opinion. Intervenor Consolidated Edison Company of New York, Inc., supports the Commission's order, as does intervenor Town of Cornwall.

New York City at Storm King Mountain near Cornwall, New York, "an area of unique beauty and major historical significance." *Scenic Hudson, supra* at 613. The project would consist, as did the earlier version, of an upper reservoir, a tunnel between the reservoir and the powerhouse, and the powerhouse itself, a pumping-generation station located at the riverside containing eight reversible pump-turbine and motor generation units as well as switching gear and primary transmission lines. However, unlike the project presented in 1965, which provided for a powerhouse that was 80 per cent underground, the powerhouse now licensed by the Commission is to be entirely underground.

The upper reservoir would be situated approximately 10,000 feet south and west of the powerhouse in a natural mountain basin behind Storm King Mountain. When filled to its maximum elevation it would have a surface area of 240 acres. It would be formed and enclosed by five earth and rock dikes. The lower reservoir would be the Hudson River itself.

The capacity of the eight pumping-generating units in the powerhouse would be 2,000 megawatts, or 2,000,000 kilowatts.[2] However, the project would be constructed in a manner which would permit enlargement to a maximum of 3,000 mw. Eight discharge tunnels from the reversible pump-turbine and motor generation units would convey water between each turbine and an open tailrace leading to the river. The tailrace with abutments at both ends would run 685 feet along the river. A fish protective device is to be located in front of the tailrace intake.

The third major facet of the project relates to transmission facilities. Submarine cable installations and spare

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2 One megawatt (mc) equals 1 million watts; one kilowatt (kw) equals one thousand watts. We will use the megawatt terminology throughout this opinion.

pipes would transmit the energy generated in the powerhouse under the Hudson River and would continue underground on the east side of the river for approximately 1.6 miles to a point out of sight of the river. At this point overhead transmission would commence and would continue for approximately 9.2 miles through Putnam County to Con Edison's existing Pleasant Valley-Millwood-Sprain Brook transmission right of way. Changes have been made in the proposed route and the towns of Cortlandt, Putnam Valley and Yorktown, which challenged the route before this court in 1965, no longer do so.

The project would function in the manner described in our earlier opinion. *Scenic Hudson, supra* at 612. The units in the powerhouse would use off-peak energy generated not at the project but at other facilities in the Con Ed system to pump water from the Hudson River to the upper reservoir. When needed for peak power production, that is, during hours of highest kilowatt demand, the units would reverse direction of rotation and provide power derived from the fall of the water released into the river from the upper reservoir. This power would then be transmitted through the transmission system described above. "The water in the upper reservoir may be regarded as the equivalent of stored electrical energy; in effect, Consolidated Edison wishes to create a huge storage battery at Cornwall." *Scenic Hudson, supra* at 612.

A visitor's information center and picnic and parking facilities, proposed in the original project for the powerhouse site, have been eliminated. In their place, a 57 acre, mile-long park is to be constructed along the riverfront. Additional recreational facilities are to be provided at a 36 acre scenic overlook inland from the project with access from the existing State Highway 9-W.

As an alternative the Commission has licensed the powerhouse aspect of the project at a location within

Palisades Interstate Park, approximately one and one-half miles downstream from the Storm King Mountain site. Construction at the Palisades site is to be considered approved by the Commission only if construction at the Storm King Mountain site "shall be precluded on a petition to review this order."

The petitions in this case are occasioned by the "grave concern" aroused among conservationist groups by the Storm King project. *Scenic Hudson, supra* at 612. The petitions allege lack of compliance with the terms of our earlier remand, absence of substantial evidence to support the Commission's findings, and failure to comply with statutory mandates. We find, however, that the Commission has fully complied with our earlier mandate and with the applicable statutes and that its findings are supported by substantial evidence. In view of the extensive powers delegated to the Commission and the limited scope of review entrusted to this court, it is our duty to deny the petitions.

I.

Congress has given the Federal Power Commission broad responsibility for the development of national policies in the area of electric power. In Section 4(e) of the Federal Power Act, 16 U.S.C. §797(e)(1964), the Commission is authorized

> "To issue licenses . . . for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines or other project works necessary or convenient for the development and improvement of navigation and for the development, transmission, and utilization of power across, along, from, or in any of the streams or other bodies of water over which Congress has jurisdiction. . . ."

There are statutory limitations on the issuance of such licenses. Section 10(a) of the Act, 16 U.S.C. §803(a) (1964), requires

> "That the project adopted . . . shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, and for other beneficial public uses, including recreational purposes. . . ."

The Commission is now obliged also to consider the environmental factors covered by the National Environmental Policy Act, 42 U.S.C. §§4321 *et seq.* (Supp. 1971).

In the Federal Power Act Congress granted the Commission "sweeping authority and a specific planning responsibility." The Act "was the outgrowth of a widely supported effort on the part of conservationists to secure the enactment of a complete scheme of national regulation which would promote the comprehensive development of the nation's water resources." *Scenic Hudson, supra* at 613 and authorities cited there.

The scope of review of the Commission's exercise of its authority and responsibility is narrowly limited. The Act, §313(b), provides that "[t]he finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive." 16 U.S.C. §825 *l*(b). In assessing the factual contentions raised in the petitions, this court's authority "is essentially narrow and circumscribed." *Permian Basin Area Rate Cases*, 390 U.S. 747, 766 (1968). The licensing of projects such as the Storm King plant and the evaluation of their environmental impact has been entrusted to "the informed judgment of the Commission, and not to the preferences of reviewing courts." Id. at 767.

The statutory standard of substantial evidence is "something less than the weight of the evidence and the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Consolo* v. *Federal Maritime Commission*, 383 U.S. 607, 620 (1966). In a recent case involving these principles of court review, the Supreme Court said:

> "Insofar as the Court of Appeals' opinion implies that there was not substantial evidence to support a finding of *some* benefits, it is clearly wrong. And insofar as the court's opinion implies that the responsibilities assumed by Gainesville in combination with the benefits found to accrue to Florida Power were insufficient to constitute 'compensation . . . reasonably due,' the Court of Appeals overstepped the role of the judiciary. Congress ordained that that determination should be made, in the first instance, by the Commission, and on the record made in this case, the Court of Appeals erred in not deferring to the Commission's expert judgment." *Gainesville Utilities Department* v. *Florida Power Corp.*, 402 U.S. 515, 527 (1971).

Petitioners would have us reject these familiar principles because, they argue, different standards ought to prevail with respect to issues arising in an environmental context.[3] There is an effort to find a basis for this position in our earlier remand in *Scenic Hudson* and in cases which have taken a similar approach.[4] See, *e.g.*, *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402 (1971); *Udall* v.

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3 Sive, *Some Thoughts of an Environmental Lawyer in the Wilderness of Administrative Law*, 70 Colum. L. Rev. 612 (1970), seeks to provide support for such a position.

4 *Id.* at 631 *et seq.* and 650-51.

Federal Power Commission, 387 U.S. 428 (1967); *Zabel* v. *Tabb*, 430 F.2d 199, 213 (5th Cir. 1970), *cert. denied*, 401 U.S. 910 (1971).

To read these cases as sanctioning a new standard of judicial review for findings on matters of environmental policy is to misconstrue both the holdings in the cases and the nature of our remand in *Scenic Hudson*. An element common to all these cases was the failure of an agency or other governmental authority to give adequate consideration to the environmental factors in the situations with which they were presented. In *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, *supra* at 416, for example, the Court remanded the case to the district court to determine whether the Secretary of Transportation's decision "was based on a consideration of the relevant factors." The Court pointed out that "[a]lthough this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency." Id. In *Udall* v. *Federal Power Commission*, *supra* at 450-51, the remand to the Commission instructed it to explore the "neglected phases of the cases" and to make "an informed judgment on these phases of the cases." The Court explicitly stated that it expressed "no opinion on the merits." It added, "It is not our task to determine whether any dam at all should be built or whether if one is authorized it should be private or public." Id. at 450.

In our opinion in *Scenic Hudson*, *supra*, remanding the 1965 orders of the Commission, we were careful to make it clear that we were raising no question of change in the basic standard of administrative review and that the purpose of our remand was only to require the proper performance of its functions by the Commission. We said:

> "While the courts have no authority to concern themselves with the policies of the Commission, it is their

> duty to see to it that the Commission's decisions receive that careful consideration which the statute contemplates." Id. at 612.
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> . . . .
>
> "This court cannot and should not attempt to substitute its judgment for that of the Commission. But we must decide whether the Commission has correctly discharged its duties . . . . The Commission must see to it that the record is complete." Id. at 620.

Where the Commission has considered all relevant factors, and where the challenged findings, based on such full consideration, are supported by substantial evidence, we will not allow our personal views as to the desirability of the result reached by the Commission to influence us in our decision. We now turn therefore to an examination of whether our remand has been complied with, whether there is substantial evidence to support the Commission's decisions on the issues remanded and other challenged issues, and whether the Commission has complied with all applicable statutory requirements.

II.

In our opinion remanding this proceeding to the Commission we directed the Commission to weigh a number of factors which we believed had not been given adequate consideration. Holding that "recreational purposes" in §10(a) of the Act (16 U.S.C. §803(a)(1964)) "encompasses the conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites," we required the Commission "properly [to] weigh each [such] factor." *Scenic Hudson, supra* at 614. We held "that the Commission is under a statutory duty to give full consideration to alternative plans" (Id. at 617). We criticized the Commis-

sion's refusal to "receive proffered information on fish protective devices and underground transmission facilities . . . ." Id. at 620, and directed it to "take the whole fisheries question into consideration before deciding whether the Storm King project is to be licensed." (Id. at 624). We ordered the Commission to weigh "the aesthetic advantages of underground transmission lines against the economic disadvantages" (Id. at 623). In sum the Commission was admonished to "reexamine all questions on which we have found the record insufficient and all related matters." (Id. at 624).

On January 25, 1966, acting on our remand, the Commission ordered that further proceedings be commenced before a Hearing Examiner. In that order the Commission said:

> "We do not understand the Court's order as restricting any further proceedings to the specific matters on which it found the present record insufficient to support our previous determinations and we do not believe it would be in the public interest to do so. The record in the first two hearings in the proceeding will, of course, be part of the present hearing. But all parties will be free to offer timely presentations of evidence on all matters relevant to the question whether a license should be granted."

The hearings were commenced on November 14, 1966 and with several brief recesses, were concluded on May 23, 1967. A motion of the State of Connecticut's Board of Fisheries and Game to intervene was subsequently granted, and further hearings were held on the issue of the protection of fish. These hearings were closed on October 16, 1967. On August 6, 1968, the Hearing Examiner issued his Initial Decision recommending that Con Ed be granted a 50 year license for the project. On November 19, 1968, the proceed-

ings were reopened in response to a petition by the City of New York to intervene and introduce evidence on possible hazards to its Catskill Aqueduct. At this proceeding, further evidence was taken on the alternative site in Palisades Interstate Park. The Hearing Examiner issued a Supplemental Initial Decision on December 23, 1969, which concluded that the project did not endanger the Aqueduct and that the alternative site was "not a proper and preferable alternative location for applicant's projected project." In all other respects, except for minor items,[5] the Initial Decision remained unchanged.

The proceedings on remand involved 100 hearing days, the testimony of some sixty expert witnesses, and the introduction of 675 exhibits. The record comprises more than 19,000 pages. Both the Hearing Examiner and the Commissioners arranged with the parties to visit the proposed site and the surrounding area before rendering their decisions.

On August 19, 1970, the Commission issued its decision. In its opinion the Commission reviewed the power needs of the area served by Con Ed and considered possible alternatives to the Storm King project in terms of reliability, cost, air and noise pollution, and overall environmental impact. Concluding that there was no satisfactory alternative, the Commission evaluated the environmental effects of the project itself. It held that the scenic impact would be minimal, that no historic site would be adversely affected, that the fish would be adequately protected and that the proposed park and scenic overlook would enhance recreational facilities. The Commission found that further

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5 The Initial Decision was amended "only to provide for the location of a switching station at Carmel on Applicant's main transmission system instead of Kent; and for the redesign of the Cornwall East switching station and the Cornwall transformer gallery, in connection with the relocation of circuit breakers, bus and related equipment. . . ."

undergrounding of transmission lines would result in unreliability in the delivery of power and would be too costly. The Commission determined that construction of the project would entail no appreciable hazard to the Aqueduct.[6]

We find that the proceedings of the Commission and its report meet the objections upon the basis of which we remanded the earlier determination. Examination of the Commission's conclusions and the evidence on which the conclusions are based establishes that the Commission has complied with our instructions and that the evidence supporting the Commission's conclusions amply meets the statutory requirement of substantiality.

A. *"Alternative plans"*

The Commission gave detailed and comprehensive consideration to alternatives. Its initial statement of the basic issues of the case before it and the manner of its subsequent dealing with those issues demonstrates that there is no sound basis for petitioners' contention that the Commission's approach was too narrow. The Commission said:

> "The weighing of social values required by the concept of the public convenience and necessity in this case involves on the one hand the alleged greater and much needed reliability, economic savings, and anti-air pollution benefits which this project offers compared with any feasible alternative, and on the other hand the alleged aesthetic and enviornmental detriment the project would impose on an area of great scenic, natural and historic value.

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6 The Commission, disagreeing with its Hearing Examiner, authorized use of the alternative site within Palisades Interstate Park on the conditions to which we have referred above. In view of our denial of the petitions in this case, it will be unnecessary for us to review this last determination.

> Simply put, the issue is whether the project offers substantially more reliable electric service as well as cheaper electricity generated in a cleaner manner than any other feasible alternative and, if so, whether the project will create detrimental aesthetic and environmental conditions of such degree as to lead on balance to a judgment that the public convenience and necessity would be better served by denying the application herein."

In deciding this issue the Commission proceeded to evaluate the needs of Con Ed and the probability that the proposed project would supply these needs in a more desirable way than would the possible alternatives.

The Con Ed system serves the densely populated area of New York City's five boroughs and part of Westchester County. The electric load requirements that Con Ed must meet are constantly growing. The Commission found that in 1970 Con Ed's capacity would be approximately 10,126 mw, plus 520 mw contracted from other utilities. However, much of the system is outdated and about 2,000 mw of its present capacity are due to be eliminated by 1978. And yet by 1979, Con Edison's annual peak load[7] will be approximately 10,850 mw.

Two factors were cited by the Commission as necessary to insure availability of the required amount of energy and to prevent major power failures, such as that which occurred in the northeast United States in 1965, as well as the lesser "brownouts" and "blackouts" which have become all too frequent in the New York area. The first of these two factors is the existence of adequate power facilities to meet the growing demand for electrical energy in the area served. The second is an adequate "reserve," a part of

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7 The Commission noted that the annual peak loads have shifted from the winter season to the summer.

which must be what is called a "spinning reserve." [8] This "spinning reserve" is provided by units operating at less than full capacity but synchronized to the system so that the energy generated by them will all be immediately available to meet an increase in loads. It is this latter need that the Storm King project is designed to meet.

The Commission found that in order to prevent a major power failure the "spinning reserve" must be fully available within two minutes.[9] The Commission expressed the opinion, based on the record before it, that "if Cornwall or a pumped storage equivalent with its very fast pick-up characteristics had been available the blackout of 1965 might have been avoided."

The Commission examined in detail the possibility that there were alternatives more desirable than the Storm King project which would be capable of meeting these needs. Our earlier opinion required the Commission to consider the use of gas turbines. The Commission determined that using gas turbines alone would not be a feasible alternative to a pumped storage unit since the turbines would be less reliable and more expensive. Gas turbines, the Commission found, take between three minutes and ten seconds and four minutes to be brought to full operation from a cold start. Moreover, the Commission stated, unlike pumped storage units, gas turbines have a relatively low capacity for storage of rotational energy, and thus do not provide as substantial a cushioning effect in the event of a disturbance.

Gas turbines were found to be considerably more expensive to operate than pumped storage units. The Com-

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8 *See* Prevention of Power Failures, A Report to the President by the Federal Power Commission July 1967, Volume I at 43-44.

9 "It appears from the evidence that to be effective in such an event 70 to 75% of the spinning reserve should be synchronized and available in 30 seconds to one minute, with all of the reserve available within two minutes."

mission adopted the conclusion of a staff study that the operating costs of a pumped storage project would be at least $119,000,000 less over a twenty-year period than the operating costs of gas turbines.[10] It would cost about $38,000,000 less, the study estimated, to construct the pumped storage project than to provide the gas turbines.

The Commission also considered the possibilities of a project composed entirely of nuclear units but found that such an alternative would be inadequate for reasons which are fully developed in the report. The Commission was of the opinion that a nuclear-gas turbine combination[11]

> "suffers from the shortcomings inherent in its components, that is, unless the gas turbines are spinning they cannot be brought into operation soon enough to meet emergencies and the nuclear component has relatively slow response characteristics which when combined with the forced outage reduces the reliability quotient of such a combination."

"[T]he reliability quotient of a nuclear-gas turbine combination," the Commission said, "is far less than Cornwall's."

The Commission estimated that construction of the nuclear-gas turbine alternative would cost $158,794,000 more than Cornwall. On the basis of these findings the Commission said:

> "We do not accept the proposition put forth by Scenic Hudson that this extra cost is *de minimis* when

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10 A Con Ed study had estimated a twenty year operating savings of $137,023,000.

11 Several combinations of gas turbines and a nuclear unit were proposed. Con Ed believed that eight gas turbines would be required, Scenic Hudson, five. The staff study concluded that six somewhat larger units would be adequate. The Commission based its conclusions on the combination found by the Examiner to be most appropriate: seven turbine units coupled with a 1000 mw nuclear unit.

spread among all of Con Ed's customers. There are often good reasons why it is in the public interest to utilize a more expensive alternative. In appropriate cases the extra cost may even be substantial. But whether substantial or not, the extra cost must be justified by a showing that the alternative is in the public interest. There has been no showing that a combination nuclear-gas turbine alternative offers any advantages or indeed is even reasonably equivalent to Cornwall."

The Commission also considered the feasibility of using power purchased from outside sources to supply Con Ed's needs as an alternative to building the Storm King plant. It found that the maximum amount that could be assured would be slightly in excess of 1000 mw.[12] Thus this alternative, the Commission held, would not provide sufficient power.

Petitioners do not suggest that interconnections alone could provide a feasible solution. Scenic Hudson proposed a combination of 810 mw of purchased power with gas turbines. However since the gas turbines in this combination would *not* be used to generate spinning reserves but to take on the load, the Commission found that this alternative would not serve the principal function for which the Storm King project is designed:

"In view of the assumption inherent in this suggestion by Scenic Hudson that the gas turbines would not operate as a spinning reserve, the spinning reserve would have to come from the purchase sources

12 The New York Power Pool consists of the Upstate New York System and the Southeastern New York Companies (SENY). The Commission estimates that the seasonal exchange between these two would amount to 500 mw in 1975 taking into account the requirements for maintenance of generating capacity. Another 465 mw could be secured from the New England Power Pool and the Pennsylvania-New Jersey-Maryland Power Pool.

if this alternative is to be comparable to Cornwall. Accordingly this possibility cannot be deemed reliable, since such purchases would not be available in the event of a separation, the very time they would be most needed."

The Commission also examined the possibility of alternative sites for a pumped storage project. As the Commission points out, none of the petitioners offered any evidence on possible alternative hydro-electric sites. However, both Con Ed and the Commission staff conducted extensive surveys to determine if such alternatives existed within a hundred mile radius of New York City. Detailed studies for five such sites showed that they would be more costly and less reliable than the Cornwall project. All of them would require the construction of long transmission lines. For example, the Bashbish site, in New England, would require a transmission system of between 32 and 56 miles, with attendant effects on the surrounding land, as compared to the 9.2 miles of overhead corridor planned for the Cornwall project.

In its examination of alternatives the Commission considered their effect on air pollution, noise pollution and the overall environmental situation. Nuclear energy was found by the Commission to be the method of generation of electric power involving the least pollution. However since nuclear energy by itself is inadequate for peaking purposes, the effect on air pollution must be measured with relation to gas turbines, operating either as part of a nuclear-gas turbine system or operated partly loaded as spinning reserve. The Commission pointed out that the peaking energy generated at the Cornwall project is itself pollution free. Whatever pollution results from the operation of the project will be caused by the plants which supply the power for pumping the water into the reservoir.

As the Commission said, "if the energy necessary to pump Cornwall comes from polluting power plants in New York City that would otherwise be idle, little or nothing would be gained in reducing the air pollution problem." The Commission concluded, however, that "water for Cornwall will normally be pumped by use of electric energy from non-polluting sources . . . ." The Commission believed that construction of the Cornwall project would permit a more rapid replacement of old relatively inefficient steam-electric plants with large nuclear plants. Even during the early years of the project's operation, because pumping would take place during off-peak hours, i.e., at night, "clean-burning" natural gas would probably be available in amounts sufficient to meet a large part of the Cornwall requirements.

The Commission pointed out that proposed alternative methods of meeting Con Ed's need for power, since they too require construction of new facilities, would have an overall impact on the physical environment similar to that to which the opponents of the Cornwall project are objecting.

> "Still another approach to weighing 'alternatives to the proposed action' from an environmental standpoint is to compare the operational consequence to the environment of the Cornwall project with similar consequences which would result from any reasonable alternative project. We conclude that none of the most likely proposed alternatives, including an all-nuclear unit or the mixed nuclear and gas turbine combination, could be sited within 100 miles of New York City with any less physical impact on the environmental aspects of the affected area than the Cornwall project."

B. *"The conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites."*

The Commission gave extended consideration to the environmental aspect of our remand order. Testimony was taken from "a veritable 'Who's Who' of conservation, each witness discussing a different facet of this esoteric and subjective matter." The Commission said: "[O]ur conclusion that the license must issue does not rest upon any discounting of the case made by the intervenors relating to the natural beauty, historical significance, and spiritual qualities of the Storm King Mountain in its setting." Its essential finding in this regard was that the Cornwall project, as modified by the Commission to make any structures not buried "as unobtrusive as ingenuity can make them," constitutes "no real impairment of the environmental and scenic aspects of the Highlands."

The original plan for the project provided for a powerhouse that would be 80 per cent underground. The project licensed by the Commission now calls for the powerhouse to be completely underground. While in an area visually part of Storm King Mountain, the powerhouse would not be under the mountain itself but in the Village of Cornwall "on a small river-bottom foothill." Scenic Hudson's witness Vincent J. Scully, professor of art and architecture at Yale University, although he was opposed to other features of the project, stated that the underground powerhouse itself did not "enter into the problem of visual relationship." The external features of the powerhouse site would all be located below the cut of Storm King Highway on the mountain.[13] The only features on the powerhouse site which would be aboveground would be the en-

13 The highway crosses the mountain at an elevation varying from 200 feet to 280 feet. The height of Storm King Mountain is 1,343 feet.

trance to the underground plant, an access road, and the tailrace. The Commission said that "the land surface above the power station will be planted and as much of the existing growth as possible preserved."

The tailrace and abutments would be located at the river's edge, in an area partially occupied at present by a decidedly unscenic railroad bridge. The tailrace would be 685 feet long, with a vertical rock cut rising from 10 to 32 feet above the river. At the east end of the tailrace the visible height of the cut would be at most 20 feet above the existing railroad bridge. At the west end, the cut would be completely obscured by the existing bridge. The Commission pointed out that the "planting of vines on the rock face behind the tailrace would further serve to ameliorate the view from the river." With respect to the effect of the construction of the tailrace on the view of the mountain, the Commission said:

> "The tailrace would be located where the river widens above the gorge and curves west by north, above the powerhouse. From the bank directly across the river the distance is 4000 feet. Because of the curved shoreline at that distance, at the river level there would be no direct view of the tailrace."

The tailrace and the vertical cut would not, therefore, destroy a scenic, unspoiled view of the mountain. They would in large part be hidden from view by existing man-made structures or natural phenomena. The scenic impact of that part of the tailrace and cut that would be visible are to be evaluated not in terms of the number of square feet potentially visible but in terms of the entire visible panorama. The total area that would be occupied would be minuscule in proportion to the total area encompassed within a viewer's peripheral vision. The Commission could

reasonably find that with the river in the foreground and the mountain majestically rising 1343 feet behind, the tailrace and the vertical cut would not seriously impair the mountain's scenic aspects.

The Commission found, in summary, that:

> "Limiting the external features at the powerhouse site to the portal entrance, tailrace, and access road, totalling approximately 3 or 4 acres—out of Storm King's total of over 400 acres—should reduce to a minimum the visual impact on the scenic vistas of Storm King Mountain or the Highland Gorge of the Hudson River and thereby preclude any material scenic impairment or detriment."

The reservoir would not be on Storm King Mountain itself but behind the mountain from the river about two miles south and west of the powerhouse site, on lands owned in part by the Village of Cornwall and in part by Harvard University.[14] It would not be visible from the river; its visibility from other points "varies in relation to the elevation and distance of the view." From many of the points from which the reservoir can be seen various industrial developments can be seen as well.

The Commission found that, although the 240 acre reservoir will be larger than any of the other nearby bodies of water, "in the scale of the area it does not reasonably appear to dwarf the scene. Nor should it be materially different in appearance from ponds in the area and thus should not be deemed incongruous with the present character of the area." [15]

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14 The part owned by Harvard is a portion of Black Rock Forest, a 3,700 acre experimental tract of timber. About 240 acres at the east end of the forest would be acquired for the project. The remaining land will be unaffected.

15 The Commission noted that all large ponds in the area are artificial.

Finally with respect to the contention that the inside walls of mud, or rock fill, would be exposed as the reservoir rises and falls, the Commission found that the rock and earth comprising the dikes would not be out of character with the rock and bare spots common in the Highlands and that "[t]he plantings and natural growth which would adhere to the exterior and possibly interior surfaces of the dikes would also serve to ameliorate any intrusion of the reservoir and dikes on the natural scene."

The Commission's criticisms led to the substantial modification of the recreational aspects of the project. Con Ed's original proposal included an information center and recreation area to be located in the vicinity of the powerhouse site. These features were eliminated by the Commission. The Commission approved the construction of a riverfront park and a scenic overlook. The park is to be built on the rock excavated from the site of the power plant. It would be located in that part of the river to the north and west of the project adjacent to the shoreline. This 57 acre mile-long recreational facility, to be linked by two bridges to the Town of Cornwall to which it will be transferred upon completion, is to consist of play area, picnic sites, shelters, and sanitary facilities. The scenic overlook is to occupy a 36 acre tract abutting State Highway 9-W, and would also include picnic sites.[16] The Commission found that the overlook would enable visitors to enjoy "the scenic vistas of the Hudson River" [17] and "will not seriously or substantially

16 Of the one hundred and forty acres to be acquired by Con Ed, over 100 acres is to be transferred to the Palisades Interstate Park Commission for recreational use.

17 This accords with the findings of the New England-New York Inter-Agency Committee, Report of the New England-New York Region, Subregion "E" (Hudson River Basin), 999 (d) (reprinted as Sen. Doc. No. 14, 85th Cong., 1st Sess. (1957)) which recommended for the Hudson River Gorge ". . . establishment of a system of highway waysides . . . to make available, in a safe manner, the scenic vistas of the countryside."

impinge on the scenic historic or environmental qualities of the area."

The Commission heard extensive testimony on the effect of the project on historic sites in the area. There is no record that any event of historical significance took place at Cornwall or on Storm King Mountain. Constitution Island and West Point, and Forts Clinton and Montgomery, which are at Bear Mountain considerably below the project site, are the closest areas of historical importance. The project site is not visible from either Constitution Island or West Point. However, Constitution Island, which has the best preserved revolutionary fortification in the Highlands, will be visible from the proposed scenic overlook. None of the parties has offered any specific rebuttal to the Commission's conclusion that "the project will not cause the destruction of any historical site." [18]

The thrust of petitioners' arguments is that the principle of preservation of scenic beauty permits of no intrusion at all into this area and that, therefore, no power plant, no matter how innocuous, may be built. This is clearly a policy determination which, whatever may be our personal views, we do not have the power to impose on the Commission. The Commission has complied with the terms of our remand by giving careful and thorough consideration to the

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18 The propriety of the use by the Commission of the findings of the Advisory Council on Historic Preservation, set up by the Historic Preservation Act of 1966, 16 U.S.C. §470 f (Supp. 1971), is the subject of some dispute. The Advisory Council found that plans for the project would have a "minimal adverse effect" on the scenic values of the area. Petitioner Scenic Hudson contends that the Council's finding is not only contrary to evidence but also that it ought not to be considered by the Commission because Scenic Hudson did not participate in the deliberations of the Council while the Commission's staff did. The Commission ruled that it had a statutory obligation to consider the report. We need not resolve this minor issue since the Commission stated that its "finding is made on the basis of record evidence, independent of consideration of the findings of the Advisory Council, which simply affirms our conclusion."

impact of the project on the envirnoment. The conclusions it has reached are supported by substantial evidence.

C. *The "fisheries question."*

In our remand order, in additional to requiring further consideration of the overall environmental impact of the project, we specifically directed the Commission to "take the whole fisheries question into consideration before deciding whether the Storm King Project is to be licensed." *Scenic Hudson, supra* at 624. We had in mind the allegations of fishermen's groups that the project threatened to destroy the eggs of the striped bass whose major spawning grounds, they maintained, are in the immediate vicinity of the project, and "that 'no screening device presently feasible would adequately protect these early stages of fish life' and that their loss would ultimately destroy the economically valuable fisheries." Id.

The Commission took official notice of the report of the Hudson River Policy Committee entitled "Hudson River Fisheries Investigations 1965-1968," which was based upon a study sponsored by the New York State Conservation Department and the United States Fish and Wildlife Service and conducted under the field direction of a technical advisor of the United States Bureau of Sport Fisheries.

The "Hudson River Fisheries Investigations" concluded that:

> ". . . the evidence indicates that there would not be any significant adverse effects to the striped bass and American shad fisheries of the Hudson River from a pumped storage generating plant at Cornwall, New York."

The Policy Committee's study lends strong support to the views presented by a number of witnesses at the hear-

ings to the effect that the spawning grounds of striped bass extend from locations at river mile 35 to river mile 123, and that these spawning grounds are, in the Commission's words, "not consistently more favorable in one location than another." The Commission found "that bass spawn substantially in the Hudson River over an 80 mile reach, including the Cornwall area, and that no part thereof is distinguished as a major spawning area."

The devices originally proposed to protect the fish have been redesigned to afford greater protection. Referring to the testimony of a fishery biologist from the Commission staff, the Commission said:

> ". . . that while the mortality rates of fish, fish eggs, and larvae inhabiting the water which will be drawn through the screen and the plant cannot be measured short of actual measurement during project operation, in his own opinion the losses to the fishery caused by the operation of the project would not significantly affect the Hudson River fishery resources."

In order to compensate for the loss of fish resulting from the operation of the proposed plant, Con Ed proposed, and the Commission approved, construction of a fish hatchery. The Commission concluded:

> "Witness Raney's fear[19] as to what might or could happen are counterbalanced by testimony based on sam-

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19 Scenic Hudson's witness, Raney, testified:

> "Anything that man does is substantially opposed to nature. So if you build any sort of a structure you will have situations which are not found naturally in the environment so here you have an additional situation where you have fishes drawn up into an artificial impoundment, eggs drawn up, larvae drawn up, possibly thirty species upon which they feed. So it is a very complicated business to try to evaluate the overall effect this will have. But basically the effect will be harmful to the fishes.

. . . . . .

pling studies which relating egg producing capacity of the striped bass to volumes of water in plant operation indicates that the impact on Hudson fishery would not be substantial. Thus even if none of the fish and eggs at Cornwall survived, the total impact would be small. The evidence, however, is to the effect that no such disaster would befall the Cornwall segment. Eggs, larvae and fish entering the plant would have a survival rate in the area of 80 per cent. Further, hatchery operations elsewhere indicate the feasibility of an operation in the Hudson which would be capable of replacing any losses attributable to the project."

D. *The "aesthetic advantages of underground transmission lines against the economic disadvantages" and related routing problems.*

In compliance with our mandate, the Commission investigated the possibility of constructing the transmission lines of the project entirely underground. The Commission weighed the obvious aesthetic advantage of underground transmission as against its economic and functional disadvantages.

The evidence shows that putting the transmission lines underground would cost substantially more than having them overhead. The Commission's staff estimated that considering both construction and maintenance costs, underground lines would be approximately 16 times as expensive as overhead lines. The Commission explained that:

"The relative costs of undergrounding can be appreciated from the fact that the problems inherent in transmitting power underground at high voltages are

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I think anything that affects any substantial number of eggs, larvae, young or adult, could ultimately have a substantial effect on a fishery. But the degree of the effect I don't know."

not simply a matter of putting an overhead transmission line, which is merely a bare insulated piece of metal conductor, into a trench. The phenomena of heat buildup and condenser (or capacitance) effect require that underground cables be an entirely different species of equipment."

The Commission cited a number of technological factors that result in higher labor and material costs for undergrounding. Underground cable requires a type of insulation which can be applied only by highly skilled labor. Transmission of power by underground lines presents problems which can be solved only by the installation of large magnet-type coils every 2 to 3 miles. Various other expensive techniques, such as intricate splicing, are needed to meet other problems presented by the electrical and thermal properties of underground lines.

The Commission found that there were functional disadvantages in underground cables. Although overhead lines have more outages, there can generally be immediate automatic reclosure with no disruption of service. Outages in underground cables, on the other hand, result in considerably greater disruption of service since the failure must be located, the damaged area excavated, and complicated repairs made.

The Commission, balancing the several factors which are involved, concluded:

"It is thus apparent that only for the most cogent reasons, as where no feasible alternative is possible or where the aesthetic detriment is so violent as to preclude any consideration of overhead transmission facilities, that undergrounding should be required.

. . . . .

Nor do we believe it is in the public interest to burden consumers with the cost of undergrounding cables un-

less it were necessary to prevent such destruction or serious damage."

The transmission route which is now approved is different from the route challenged before this court in 1965. The new route is not the route preferred by Con Ed, but is a modified route developed by the Commission staff. Although it is 5 to 6 miles longer than the route proposed by Con Ed, it would require 4 miles less of transmission corridor because it uses a greater length of the existing Pleasant Valley-Millwood corridor. The alternative route was selected because "it will impinge less on the area through which it passes than would any other route." The area traversed is "rough, wooded and hilly. More importantly, its valleys lie in a north-easterly direction and are oriented so as to provide the possibility of locating lines below crests." The wooded nature of the area will provide natural screening. The Commission found that "the area will remain what it is now—scenic and pleasant, with open farmland and orchards and partly wooded with some brooks. To say that this will be seriously damaged or destroyed by an overhead transmission line is not consistent with reality." [20]

Since the Commission's conclusions on this issue are based upon consideration of all relevant factors and are supported by substantial evidence, they cannot be rejected.

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20 Con Ed is required by the license order to follow recognized guidelines for the construction of overhead transmission lines. Article 35(5) of the Commission's license order includes the guidelines contained in the Hudson Valley Power Commission's "Power Lines and Scenic Values in the Hudson River Valley." In addition, Con Ed is bound by the Commission's Order No. 414 which prescribes general regulations for the "protection and enhancement of aesthetic and related values in the design, location, construction, and operation of project works" (35 Fed. Reg. 18585 (1970)).

E. *The Catskill Aqueduct*

The issue of possible danger to New York City's Catskill Aqueduct was not involved in the earlier proceeding. It is presented in the new application because of the change in the Cornwall project to provide for construction of the powerhouse completely underground. As a consequence of that change the powerhouse is to be located at its closest point a distance of about 140 feet from the Moodna Pressure Tunnel, a link in the Catskill Aqueduct system. The Catskill system is one of three systems that supply New York City with substantially all of its water. Twenty-odd communities in upstate counties also have the right to, and do tap the Catskill Aqueduct.

The city contends that the Cornwall project interferes with its control of the Catskill Aqueduct and is therefore precluded by Section 27 of the Federal Power Act, 16 U.S.C. §821 (1964), which provides that:

> "Nothing contained in this chapter shall be construed as affecting or intending to affect or in any way to interfere with the laws of the respective States relating to the control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses, or any vested right acquired therein."

The argument based on Section 27 is without merit. The license that the Commission has issued does not authorize Con Ed to divert any of the city's water or to interfere with the tunnel. Moreover the "only purpose of Section 27 is to preserve to holders of state-conferred water rights a right to compensation if those rights are taken or destroyed as an incident to the exercise by another, of a license granted by the Commission." *Portland General Electric Co.* v. *Federal Power Commission*, 328 F.2d 165, 176, & no. 23 (9th Cir. 1964), citing *City of Fresno* v. *California*, 372

U.S. 627, 629-30 (1963) and *Ivanhoe Irrigation District* v. *McCracken*, 357 U.S. 275, 291 (1958), both of which involved the very similar language of Section 8 of the Reclamation Act of 1902, 43 U.S.C. §383 (1964).[21] Section 27 was not intended to give the city the power to veto Commission action.

The Commission concluded that excavation of the powerhouse site would not cause damage to the Moodna Pressure Tunnel, that controlled blasting during construction would not endanger the Aqueduct and, generally, that "the probability of damage to the Aqueduct is remote." We think that there is substantial evidence in the record to support the Commission's determination.

The Commission found that the rock underlying the project "is a very large mass of dense uniform crystalline rock underlain by sedimental rock capable of sustaining great loads." The city contends that, on the contrary, instability of the rock at the Aqueduct site can be deduced from a failure of the original Moodna Tunnel in 1913 and by the phenomenon of "popping rock" encountered in construction of the tunnel. However, the evidence shows that the failure of the original Moodna Tunnel was due to excessive water pressure and insufficient rock cover. The tunnel was corrected by construction of an alternate shaft and has operated for a period of over 50 years without untoward incident. The Commission found that "[t]he phenomenon of 'popping rock' occurs in rock of this area only at depths below 1,000 feet," far below the depth proposed for the Cornwall project.

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21 That statute provides:

"Nothing in sections . . . of this title shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested rights acquired thereunder. . . ." 43 U.S.C. §383 (1964).

Although witnesses for the City testified that stress changes caused by the powerhouse excavation and by blasting might present hazards to the Aqueduct,[22] other witnesses seriously disputed these contentions. Smith, a consulting geologist for Con Ed, testified, as the Commission said, "that he could conceive of no possible condition in this area which would make the proposed plan hazardous from a geological point of view." Dr. Bartlett W. Paulding, Jr., Associate Professor and Acting Head of the Basic Engineering Department of the Colorado School of Mines, who was retained by Con Ed at the suggestion of the City, testified that the effect of excavations on the aqueduct would be insignificant. Dr. Paulding, whom the Commission described as "a geologist and geophysicist specializing in rock mechanics," concluded, in the Commission's words

"that the absence of adverse geological conditions, coupled with the results of a photoelastic analysis of

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22 Torris Eide, consultant engineer to the Chief Engineer of the New York City Board of Water Supply testified that the removal of 254,000 cubic yards of rock might disturb the equilibrium in the forces within the rock formation, and thus present a risk to the Aqueduct. However, he had conducted no geologic or seismic tests of the area. Thomas Fluhr, engineering geologist and consultant to the New York City Board of Water Supply testified that the rock in the area appeared to be under stress. He stated "[t]he risk of failure of the aqueduct cannot be regarded as imminent but it represents a definite hazard." He conceded that the risk was small, but stated that "there certainly is some risk." He too had made no surveys beyond general mathematical studies. Malcolm T. Wane, Associate Professor of Mining and Engineering at Columbia University, testified for the city that he found that a vertical stress relief of 14% and a horizontal stress relief of 11% would result from excavation. He did not know what effect such changes would have since the present state of equilibrium of the Aqueduct was unknown. Don W. Deere, Professor in the Department of Civil Engineering and Geology at the University of Illinois, testified that there were too many unknowns to permit evaluation of stress changes. He believed that "there was a small but real risk involved to the present aqueduct because of the changes in stress and other activities associated with the construction of the project at this site."

> the stress conditions around rectangular openings . . . indicate that the existing Catskill Aqueduct will not be endangered . . . during . . . excavation for the power plant."

Similar testimony was offered by Charles P. Benziger who based his conclusion on low stress conditions at the site as shown by seismic tests in drilled holes at the point where the power station is to be located.

The Commission's conclusion that blasting would pose at most a remote possibility of damage has ample support in the record. The city's own witness, Don V. Deere, testified that it was "possible, but unlikely that blasting, if restricted and properly controlled, will cause damage to the pressure tunnel." Another of the city's witnesses, Malcolm T. Wane, testified that the effects of blasting are somewhat conjectural. Con Ed's witness Paulding testified that the Aqueduct would not be endangered if blasting charges were limited to 55 pounds per charge. The Commission's conclusion that properly controlled blasting presented at most a "remote" danger is not seriously challenged by the city.

It is clear that the resolution of highly complex technological issues such as these was entrusted by Congress to the Commission and not to the courts. Where the Commission's conclusions are supported by substantial evidence, the courts must accept them. It seems to us that it would be very difficult indeed to argue that the evidence supporting the Commission's determination with respect to the Aqueduct is insubstantial. In fact the argument presented to us on this issue appears to be either that some higher burden of proof should be imposed with respect to the matter or that the city should be able to exercise what, in effect, amounts to a veto power. However, there is no authority whatever to support the imposition

of any greater burden of proof than that provided in the statutory standard and "[s]uch a veto power easily could destroy the effectiveness of the Federal Act. It would subordinate to the control of the [city] the 'comprehensive' planning which the Act provides shall depend upon the judgment of the Federal Power Commission or other representatives of the Federal Government." *First Iowa Hydro-Electric Cooperative* v. *Federal Power Commission*, 328 U.S. 152, 164 (1946) (footnote omitted).

III.

The only remaining concern is the allegation that the Commission failed to comply with certain statutory directives.

The first of these statutes is Section 10(a) of the Federal Power Act, 16 U.S.C. §803(a) (1964 & Supp. 1971) which provides:

"§803. Conditions of license generally.

All licenses issued under sections 792, 793, 795-818, and 820-823 of this title shall be on the following conditions:

. . . .

(a) That the project adopted . . . shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, and for other beneficial public uses, including recreational purposes; and if necessary in order to secure such plan the Commission shall have authority to require the modification of any project and of the plans and specifications of the project works before approval."

This is the statute upon which, to a large extent, our earlier remand was based. In our opinion we said that the phrase "recreational purposes" "undoubtedly encompasses the conservation of natural resources, the maintenance of natural beauty, and the preservation of historic sites." *Scenic Hudson, supra* at 614. We directed the Commission to consider all of these factors in reaching its decision.

It is obvious that in finding compliance with our remand order, we also find compliance with the statute on which that order was based. As we have pointed out, the Commission has given careful and thorough consideration to "recreational purposes," and, indeed, has used its "authority to require the modification of [the] project" in a number of aspects related to this end.

There is no real dispute as to other findings required by the statute. The Commission found that there would be no impediment to navigation, that use of the Hudson River for electric generation by this project is "well adapted to development of the waterway for the use or benefit of interstate or foreign commerce," and that the project will not interfere with any future program for the river since it will discharge no chemical, thermal or solid pollutants into the waterway. In short, the Commission has given full consideration to all of the statutory factors and has thus performed the "specific planning responsibility" entrusted to it by Congress in Section 10(a).

The petitioners also claim that the Commission has violated the National Environmental Policy Act, 42 U.S.C. §§4321 et seq. (Supp. 1971). This Act was passed after the close of the hearing, but before the Commission's decision.[23] Its applicability to this proceeding is clear, and is conceded. See *Zabel* v. *Tabb*, 430 F.2d 199, 213 (5th Cir. 1970), *cert. denied*, 401 U.S. 910 (1971). Section 101 "recognizing

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23 The Act became effective January 1, 1970.

. . . the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man" requires the federal government to

> "(b) . . . use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—
>
> . . . . .
>
> (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
>
> (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities . . . ." 42 U.S.C. §4331 (Supp. 1971).

Section 102 of the Act, 42 U.S.C. §4332 (Supp. 1971), requires agencies of the federal government to take certain prescribed measures.

The policy statement in Section 101 envisions the very type of full consideration and balancing of various factors which we, by our remand order, required the Commission to undertake. Like our remand, the Act does not require that a particular decision be reached but only that all factors be fully explored. The eventual decision still remains the duty of the responsible agency.

The Commission has complied with the specific directives contained in Section 102 of the Act. The hearings reflected the "systematic, interdisciplinary approach" required by that section. The Commission consulted with other agencies, as required by Section 102, including the Chief of Engineers, the Advisory Council on Historic Preservation, the Department of the Interior, the Atomic

Energy Commission and a number of state and local groups that stand to be affected. The environmental statement required by Section 102(2)(C) of the Act, 42 U.S.C. §4332(2)(C) (1964), was submitted in the form of the Commission's opinion. In view of the exhaustive environmental findings which occupy a substantial portion of the Commission's opinion, and the Commission's explicit conformance with the enumerated portions of the required statement, we conclude that full compliance with the National Environmental Policy has been demonstrated.

IV.

We do not consider that the five years of additional investigation which followed our remand were spent in vain. The petitioners performed a valuable service in that earlier case, and later before the Commission. By reason of their efforts the Commission has reevaluated the entire Cornwall project. The modifications in the project reflect a heightened awareness of the conflict between utilitarian and aesthetic needs. Whether the project as it now stands represents a perfect balance of these needs is not for this court to decide. Since the Commission has fully performed the duties and responsibilities imposed upon it, it is our obligation to deny the petitions in all respects.

OAKES, *Circuit Judge* (dissenting):

If this case came to us without environmental overtones and with no threat to the water supply of the largest city in the United States, I would be constrained to take the viewpoint of the majority. For, whether or not I agreed with the weight given by the Federal Power Commission to alternative sources of power, such as the purchase of Canadian energy,[1] the court would be conclusively bound,

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1 The FPC findings on the feasibility of purchasing, rather than creating, power are not entirely consistent. Finding 82 says in pertinent part:

> If the energy necessary to pump Cornwall comes from polluting power plants in New York City that would otherwise be idle, little or nothing would be gained in reducing the air pollution problem. Based on the assumption that Cornwall would go into operation in 1972 a Staff study introduced in evidence showed that by 1980 approximately 89 percent of its pumping requirement could be met by virtually non-polluting sources of generation. Cornwall, to the extent that its water is not pumped by power from Con Ed low cost nuclear plants will be powered primarily from sources in areas adjacent to the Con Ed service area, and perhaps by imported Canadian hydroelectric power.

Finding 134 says in pertinent part:

> Another considered alternative to the Cornwall development is the possibility of purchased power from Canada, namely from Churchill (Hamilton) Falls project, now under construction. To be a proper source of power supply, the energy from Canada would have to be taken substantially 24 hours per day; otherwise this would not be an economic source. The transmission distance involved and the relatively high cost of transmission facilities makes Churchill Falls power comparable to base load nuclear power or base load mine-mouth power or other sources of base load power outside of New York City, rather than an alternative to the Cornwall development. There is no indication when, if ever, Churchill Falls Power might be available to electric systems outside of Canada. In addition, there is no assurance that it would be available upon system separation.
>
> It has been reported that on July 30, 1971, "dedication ceremonies" were held for a 345 KV transmission line linking the Canadian New Brunswick Power Commission with twelve investor-owned and two cooperative New England Utilities, with a power transfer capability of 600 megawatts. The intertie runs 230 miles southeast from Fredericton, New Brunswick, to Wiscasset, Maine. In its first 25 days of operation

both under Section 313(b) of the Federal Power Act, 16 U.S.C. §8251(b), and the case law, *e.g., Gainesville Utilities Dep't v. Florida Power Corp.*, 91 S.Ct. 1592 (1971), by findings supported by "substantial evidence," particularly when the Commission is acting within its own field of "expertise and judgment" *Gainesville, supra,* 91 S.Ct. at 1598. It is also true, of course, that the courts cannot quarrel with the Congressional policy impliedly expressed in Sections 207 and 311 of the Federal Power Act, that puts great emphasis on "adequate service," 16 U.S.C. §824f, the "cost of generation . . ." and "the development of navigation, industry, commerce, and the national defense," 16 U.S.C. §825j.[2]

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it transmitted 58,000,000 KWH of base-load and peaking energy. Other Canadian interconnections total about 3540 MW, including 2,000 MW to New York and Michigan. See Public Power Weekly Newsletter (A.P.P.A.), Aug. 6, 1971, at 5. It is also interesting to note that on July 21, 1971, Senators Metcalf and McGovern introduced S. 2324, a bill to establish "a national power grid system," the underlying concept of which was perhaps first advanced by the father of modern conservation, Governor Gifford Pinchot of Pennsylvania. In the course of Rhode Island Representative Tiernan's remarks on the companion House Bill (H.R. 9970), he said:

> Only with a national grid system can we assure all Americans an adequate and reliable supply of electric power. . . . An [sic] an example of how the national grid could accomplish this, consider the acute power shortage which struck New York City in 1969. Basin Electric Power Cooperative in North Dakota, along with the Bureau of Reclamation and Missouri Basin System wired Consolidated Edison in New York to say that they would supply all of the power New York needed. The city remained dim, however, because there was no way to transmit the power from North Dakota to New York. Had a national grid existed, this power would have been readily available to the energy-starved area. 117 Cong. Rec. H7005 (daily ed. July 21, 1971).

2. Section 207 of the Federal Power Act, 16 U.S.C. §824f, does not speak of conserving use of electrical energy, a policy which Consolidated Edison, the applicant here, is at least partially promoting with its 1971 "Save-A-Watt" advertising campaign. Nor does Section 311, 16 U.S.C. §825j (dealing with the investigatory and information-gathering function of the FPC) in any way refer to conservation of the environ-

On the other hand Congress has now placed a measure of responsibility with the FPC, and the other federal agencies, to take environmental factors into account.[3] The FPC also has its own duties, specified in Section 10(a) of the Federal Power Act, 16 U.S.C. §803(a), to issue a license to use water power only when the project will be best adapted for "beneficial public uses, including recreational purposes." And indeed as Judge Learned Hand once put it, although in reference to agency interpretation of statutes:

> In spite of the plenitude of discussion in recent years as to how far courts must defer to the rulings of an administrative tribunal, it is doubtful whether in the

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ment. We are left with Congressional policy underlying the Federal Power Act that is read to assume that future electrical needs will increase and that the only way to meet them is to construct more and more generating capacity. This is an assumption that certainly bears re-examination [see P. Ehrlich & J. Holdren, "The Energy Crisis," Saturday Review, August 7, 1971, at 50], and one which automatically—in the present state of the generating art—involves a consumption of depletable natural resources (coal, oil, natural gas, uranium), an adverse impact of one sort or another on the environment, or both. The 1970 National Power Survey (FPC) Pt. II estimates annual "peak demands" for the metropolitan New York City power supply area at 7,350,000 Kilowatts in 1970, 13,360,000 in 1980 and 21,160,000 in 1990, *id.*, at II-1-8, and on this basis one could argue for perhaps three or four Storm King projects. The same report makes reference, *inter alia*, to the problems of air pollution from coal-fired plants, *id.*, at II-1-19; depletion of oil and gas reserves, *id.*, at II-1-19, 27; thermal pollution by nuclear plants, *id.*, at II-1-48; thermal discharges generally, *id.*, at II-1-49; ash disposal and nuclear fuel disposal, *id.*, at II-1-50. See also Sarvicki, "The National Power Crisis and Its Effect on Rural America," Rural Electrification, June 1971, at 15; M. Katz, "Decision-making in the Production of Power," Scientific American, Sept. 1971, at 191.

3 See Council on Environmental Quality, Environmental Quality—The Second Annual Report 25-26 (Aug. 1971). Sec. 102 of the National Environmental Policy Act of 1969 ("NEPA"), 42 U.S.C. §§4321-47, directs "all agencies of the Federal Government" to

> (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment;

end one can say more than that there comes a point at which the courts must form their own conclusions. Before doing so they will, of course,—like the administrative tribunals themselves—look for light from every quarter, and after all crannies have been searched, will yield to the administrative interpretation in all doubt-

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(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unqualified environmental amenities and values may be given appropriate consideration in decision-making along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by Section 552 of title 5, United States Code, and shall accompany the proposal through the existing agency review processes;

(D) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources; . . . 42 U.S.C.A. §4332.

The efficacy of this Act is in large part dependent on the decision in the instant case; as Schroeder puts it in "Pollution in Perspective: A

ful cases; but they can never abdicate. *Niagara Falls Power Co.* v. *FPC*, 137 F.2d 787, 792 (2d Cir. 1943).

I take it also that we cannot abdicate when the Commission fails "to make findings or evaluate considerations relevant to its determination." *Gainesville Utilities Dep't* v. *Florida Power Corp.*, *supra*, 91 S.Ct. at 1598 n.7; *and see Schaffer Transportation Co.* v. *United States*, 355 U.S. 83 (1957); *Scenic Hudson Preservation Conference* v. *FPC*, 354 F.2d 608 (2d Cir. 1965), *cert. denied*, 384 U.S. 941 (1966). Similarly, if the agency findings are internally inconsistent, the court is not bound to accept them. *Cf. Gallick* v. *Baltimore & Ohio R. Co.*, 372 U.S. 108, 119 (1963); *Telex Corp.* v. *Balch*, 382 F.2d 211, 215 (8th Cir. 1967); *Freightways, Inc.* v. *Stafford*, 217 F.2d 831, 835 (8th Cir. 1955); *Williams* v. *United States*, 126 F.2d 129, 132-33 (7th Cir.), *cert. denied*, 317 U.S. 655 (1942). Finally, while judicial deference to administrative expertise is required, not every agency is expert in every aspect of science, technology, aesthetics or human behavior. *Cf. Universal Camera Corp.* v. *NLRB*, 340 U.S. 474, 476 (1951); see L. Jaffe, Judicial Control of

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Survey of the Federal Effort and the Case Approach," Vol. IV, No. 2, Natural Resources Lawyer, 381, 419 (April 1971): "The key question ahead is whether, after balancing all pertinent considerations, an administrative decision is made that provides for less than full environmental protection—whether that decision will be upheld if challenged in the courts." It is interesting to note, although I place little significance on it here, that at a meeting of the Subcommittee on Environmental Quality Control of the ABA Committee on Environmental Quality, the Assistant to the Chairman of the FPC strenuously criticized NEPA, quoting a former AEC attorney who termed NEPA "an atrocious piece of legislation," calling it "woefully ambiguous," "an invitation to litigation," and expressing the hope that "reviewing courts will take a practical approach" and the fear that "to construe the statute as a rigid prescription of the quality or quantity of evidence required would quickly cripple the administrative process." Annex A, Minutes of Meeting 14, 19 (April 20, 1971). To what extent this genuinely reflects this agency's attitude toward NEPA, however, is doubtful; one might hope that Congressional concern with the U.S. environment might be given more respect by the Commission as a whole.

Administrative Action 576 *et seq.* (1965). As Professor Jaffe has said, " . . . expertness is not a magic wand which can be indiscriminately waved over the corpus of an agency's findings to preserve them from review." Id. at 613; see also 4 K. Davis, Administrative Law Treatise §30.07 (1958).

With these considerations in mind, I dissent. I dissent because I think the FPC acted arbitrarily, abusing its discretion while purporting to act under the mandate of this court in *Scenic Hudson, supra;* because its findings in respect to the Catskill Aqueduct are inconsistent and insufficient; because its findings as to the effect of the project upon New York City air pollution are incomplete and fail to take into account relevant factors; and because the Commission's findings and conclusions show that it has not really followed the mandates of the National Environmental Policy Act of 1969, Pub. L. 91-190 (Jan. 1, 1970), 42 U.S.C. §§4321-47.

The City of New York has pointed out, in opposition to the license granted by the FPC, that the Storm King (sometimes called "Cornwall") project powerhouse is proposed to be built only 140 feet from the Moodna Tunnel section of the Catskill Aqueduct. This aqueduct is one of three systems supplying water to New York City. It is a gravity-flow aqueduct over 50 years old, conveying approximately 40 per cent of the city's average daily water supply from the Ashokan Reservoir, 100 miles north of the city to the Kensico Reservoir, 15 miles north of the city line. Those who may remember the effects of severe droughts in the 1940's and the 1960's on the New York City water supply must realize the importance of such a vast quantity of water to the city, and imagine the consequences of its disruption.[4]

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4 In addition to New York City, some twenty-four smaller communities tap into the Catskill Aqueduct. Any of those towns which rely on it exclusively for water would be perhaps more seriously endangered than the City by any damage to it.

The Moodna Pressure Tunnel begins at a downtake shaft some five miles westerly of the Hudson River, set in the rock of Storm King Mountain. Lined with concrete, it tunnels through the mountain at an elevation of minus 220 feet until it is 900 feet from the river; there it descends to an elevation of minus 616 feet to the river. From this point water continues to flow under pressure at 1100 feet below the Hudson River through the Hudson Pressure Tunnel and then connects to an uptake shaft on the east side of the River, surfacing at Breakneck Ridge. This whole complex of tunnels by which the Aqueduct crosses the Hudson is known as the Moodna-Hudson-Breakneck Pressure Tunnel. It has had a continuous water flow since it broke down and was repaired in 1913[5]; consequently it has not been inspected since then. In a "pressure" tunnel, hydrostatic pressure is constantly maintained. The City, aware of the risk to its water supply from drilling, in its deed of Storm King land to the Palisades Interstate Park Commission, included a protective covenant to ban drilling within 200 feet of the Aqueduct.[6] When Consolidated Edison first proposed

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5 After the completion of the Aqueduct in 1913 there was considerable leakage in the No. 7 downshaft leading to the Hudson Tunnel, apparently attributable to the combination of hydrostatic pressure and "relief of stress" in the rock surrounding the tunnel. The tunnel had to be "dewatered" and a new shaft (No. 7A) which by-passed the failed section was drilled to correct the situation.

6 WHEREAS, the Board of Estimate of the City of New York . . . authorized a grant and conveyance to the Palisades Interstate Park Commission, of the fee of the City-owned land hereinafter described . . .

. . .

Subject to the following conditions, covenants and restrictions . . . :

1 The City of New York retains a permanent sub-surface easement to operate, maintain, and repair the Catskill Aqueduct which, at this location, is approximately 400 feet below the surface.

. . .

5 Drilling of any kind is not permitted to depths greater than 200 feet below the present surface.

in 1963 to build a powerhouse some 175 feet from the Aqueduct the City objected and in the original Consolidated Edison project turned down in *Scenic Hudson, supra*, the proposed powerhouse was moved some 400 feet to meet the City's objection.[7] At the hearings below the City presented two experienced engineers, Professor Malcolm T. Wane, with experience in mine design and rock mechanics and with mine failures due to stress conditions, and Dr. Don U. Deere, a professor of engineering and geology familiar with the major pump storage projects at Yard's Creek, Northfield Mountain and Churchill Falls. Dr. Deere concluded, on the basis that the Consolidated Edison excavation would cause an estimated 31 per cent increase in tangential stresses at the top and bottom of the tunnel and a decrease of 50 per cent on the sides, that there is "a small, but real" risk to the Aqueduct from the project. Dr. Deere pointed out that the degree of risk is unknown:

> Moreover, considering for the moment that the precise magnitude of the stress changes around the tunnel were accurately known, the effect of these stresses on stability of the tunnel lining and adjacent rock, i.e., the factor of safety, could still not be determined because neither the strength of the lining in its present condition nor of the adjacent jointed and fractured rock mass is even approximately known. Deere, 124/18,-577-78.*

He was joined in this conclusion by Dr. Wane:

> One of the outstanding features of the whole problem is a lack of specific knowledge of what exists at this

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7 When Consolidated Edison came up with its presently proposed project the City rather slowly moved to intervene and the FPC reopened the proceedings to take evidence on this project. Presumably we should not penalize the City for its delay on this, an issue of mountainous importance.

* References are to volume/page number of the transcript of the hearings.

> site . . . [since] we do not know anything about the state of nature in the immediate neighborhood of the aqueduct. Wane, 124/18,550-51.

Consolidated Edison's chief witness, Dr. Bartlett Paulding, a geologist who had done no work on tunnels or underground excavations, testified that on the basis of a "photo-elastic" technique his estimate of radial stress changes around the Aqueduct resulting from the powerhouse excavation would come to only 11 per cent, and that this meant that the excavation would not significantly affect the existing Aqueduct. Paulding, 112/17,203. Professor Wane significantly indicated that the photo-elastic method, while sound as far as it goes, only accounts for the unloading or vertical effect of excavation, not for the horizontal effects.

I do not take it that there is any particular FPC expertise in geology, and particularly the effect of unloading, that is, relief of rock stress by excavation, on pressure aqueduct tunnels. In answer to a question on oral argument along this line, the FPC assured the court that its staff had some knowledge and expertise. If this be so, one may wonder why the commission did not follow the recommendations of its staff that "an appropriate precautionary measure should be undertaken by the Applicant to safeguard the Moodna Tunnel Section of the Catskill Aqueduct." [8]

Several of the commission's own "findings" on the danger to the Aqueduct tend to support the City's position and not the applicant's, and most of the commission's findings on the Aqueduct are couched in terms of uncertainty. For example, in Finding 270 reference is made to the city's witness Fluhr and mention is made of his testimony that "there

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8 See Commission Staff Brief on Exceptions to Initial Supplemental Decision, February 12, 1970, at 11. The City itself takes the position that either to construct a by-pass of the Moodna Tunnel section of the Aqueduct or to line that section with steel would require an extensive shutdown of the Aqueduct with "a resultant risk to the integrity of the aqueduct."

is certainly some risk," but the commission never tells us what this risk is or indeed whether the commission finds any risk. Again, Finding 271 refers to the former leaking of the aqueduct necessitating its closing down during construction in 1913 and goes on to say, "any large open joints connecting the bypass[9] and aqueduct could be grouted off if the experience of the original construction is typical." The commission, however, does not tell us whether it is likely that "the experience of the original construction" will be "typical" or just how this grouting would be accomplished. Indeed, one surmises that to accomplish any grouting the Aqueduct would have to be shut down, and that this might impair the integrity of the Aqueduct.

The Findings fail to convince me that there is no substantial risk to the Aqueduct. Finding 272 says that the operation of the Aqueduct for over fifty years indicates that it can withstand all of the hydrostatic pressures and stresses involved in the construction at Cornwall. But how such operation can establish this is not indicated, since even on the Consolidated Edison evidence there will be new and changed stresses resulting from drilling and blasting for the powerhouse excavation.

In Finding 284 the commission states that "[t]he evidence, thus, reasonably is to the effect that the probability of damage by reason of blasting is *remote*" (italics supplied). But Footnote 25 to Finding 287 says "[t]here is no evidence concerning the condition of the Aqueduct's lining. Its structural integrity is unknown to the city or any of its witnesses."

The mere recitation of testimony by the Federal Power Commission does not amount to the making of findings.[10]

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9 By "by-pass" here it is unclear whether the Commission was referring to the tunnel from the reservoir to the power station.

10 *Cf. Schneiderman* v. *United States*, 320 U.S. 118, 129-31 (1943); *Kelley* v. *Everglades Drainage District*, 319 U.S. 415, 422 (1943); *Brown Paper Mill Co.* v. *Irvin*, 134 F.2d 337, 338 (8th Cir. 1943).

The comment above in Footnote 25 to Finding 287 is revealing, moreover, in that it seems to imply that there is some duty on the part of the City to make a substantial showing that the Aqueduct will break. If the structural integrity is unknown to the City or any of its witnesses, presumably it is also unknown to the commission and to Consolidated Edison's witnesses. The burden is not on the City to prove that the Aqueduct will not break, but on the applicant to prove and the commission to find no danger to public "life, health and property." [11] The commission's reliance in its Footnote to Finding 287 on trouble-free operation for fifty years under entirely different circumstances seems to me insufficient to support the required finding of safety.

Finding 290 contains the conclusion "that the evidence in the record indicates that the probability of damage to the aqueduct is remote and that a by-pass is not required." Even if this in and of itself be supported by the evidence, Finding 295 that "construction of the powerhouse will not endanger the aqueduct" is inconsistent with it and not based on the evidence: there is a world of difference between *no* danger and a "remote" danger. If a danger is "remote" the degree of "remoteness" assumes importance in proportion to the magnitude of the danger. Here the danger is obviously great, and there is no finding as to the degree of remoteness.

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11 "Further, the project must be safe so as not to endanger life, health and property." Commissioner Ross, dissenting in *Consolidated Edison Co. of New York, Inc.* (FPC March 1965), *rev'd in Scenic Hudson Preservation Conf.* v. *FPC*, 354 F.2d 608 (2d Cir. 1965), *cert. denied*, 384 U.S. 941 (1966). See also Section 10(c) of the Federal Power Act, 16 U.S.C. §803(c), requiring a licensee to "conform to such rules and regulations as the Commission may from time to time prescribe for the protection of life, health and property," and rendering the licensee liable "for all damages occasioned to the property of others by the construction . . . of the project works. . . ."

The commission's Added Findings 33 and 34 are not based upon the earlier findings and in turn are not based on the evidence when they say (1) that the construction will not constitute a hazard to the aqueduct and (2) that the site does not constitute a hazard to the aqueduct.

The most compelling statement in the record evaluating the problem is that of City's witness Thomas W. Fluhr, an engineering geologist who is a consultant for the City of New York Board of Water Supply:

> The geologic risk is that during construction of the project or during construction of the proposed bypass, stresses already present in the rock may be triggered and cause failure of the aqueduct. Moreover, even if the bypass were successfully constructed and placed in operation, and the pump-generator and transformer galleries also completed, there would be no assurance that orogenic stresses would not build up and cause failure of the aqueduct even after a lapse of many years.
>
> . . .
>
> The risk of failure of the aqueduct cannot be regarded as imminent but it represents a definite hazard. When the Moodna Tunnel was first constructed and failed, ample time was available to rebuild it since there were no consumers dependent on it for water supply. At present there is no substitute for the Catskill Aqueduct; its failure could have catastrophic consequences.
>
> Evaluation of the risk involved in constructing the power plant near the aqueduct tunnel cannot be made on an actuarial basis. The risk might be taken as a calculated business risk if only money were involved; however, a failure of this water supply system might jeopardize the lives and welfare of millions of persons

in the city and the upstate communities served by the Catskill Aqueduct. Fluhr, 110/16,837-38.[12]

On this record and on the commission's findings and in the light of the commission's own staff recommendation, I would dissent as to the Storm King site even if the aqueduct were the only factor involved. But there are other points on which it seems to me the commission was only paying lip service to the mandate of this court in *Scenic Hudson, supra.*

The first of these is air pollution.[13] While the extent to which the FPC possesses any particular expertise on air pollution may be doubted, we may assume some familiarity with the subject in the light of the commission's comments in, and experience in preparing, the 1970 National Power Survey.[14] Unfortunately, one generating plant after another has been constructed in the past without much attention to this problem[15]—one that by contrast is perhaps more readily visible for a visitor to New York

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12 Mr. Fluhr was originally engaged by the consultants to Consolidated Edison Co. and later by Consolidated Edison directly, with the understanding that the interests of the City of New York would take priority. He thought the original surface plant, rejected in *Scenic Hudson, supra*, safe and "geologically sound."

13 "Air is our most vital resource, and its pollution is our most serious environmental problem." President Nixon's Message to Congress, reported in 21 BNA Environmental Reporter 0201, 0204 (Feb. 10, 1970).

14 See pt. II, at II-2-61-62.

15 "Industries, power plants, furnaces, incinerators—these and other so-called 'stationary sources' add enormously to the pollution of the air. In highly industrialized areas, such pollution can quite literally make breathing hazardous to health, and can cause unforeseen atmospheric and meteorological problems as well." President Nixon's Message to Congress, 21 BNA Environmental Reporter at 0204 (Feb. 10, 1970).

than it may be to full-time citizens of the city.[16] The Cornwall project as an alternative to other generating methods on its face is more conducive to eliminating air pollution, except for one catch: *in order to pump water from the river to the reservoir at Cornwall,* Consolidated Edison may, as the commission order now reads, pollute the city during pumping hours, which are usually at night,[17] when the air is most still and the pollutants sit low over the city. In other words, there is no requirement that Consolidated Edison refrain from using its present generating facilities for pumping purposes; most of those facilities are, according to the commission's Finding 82, relatively inefficient and burn relatively expensive, depletable fossil fuels, and some of them are outmoded.[18]

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16 New York City is subject to pollutants emitted in both a gaseous and particulate form from a wide variety of sources, including power generating plants. Finding 75.

It should be noted that serious air pollution episodes resulting from inversions have occurred in New York City in 1953, 1963, and 1966. An "inversion" occurs in periods of little or no wind when a layer of cold air covers a layer of warm air to prevent it from rising. Without an upward current of air or wind the pollutants cannot be dispersed. As a result, the pollutants mass in a thickening stagnant cloud above the area affected and they diffuse down to the ground line. While inversions are not very frequent, they can last for several days and can be present day and night. A typical episode, to which are attributed 168 deaths, occurred during the Thanksgiving holiday, November 22 to 26, 1966. Finding 76.

17 By utilizing energy surplus to system needs during night-time and week-ends, or purchasing low cost surplus energy from interconnected systems, Cornwall is designed to convert low cost surplus energy into high value energy during periods of peak demand. Finding 70.

18 Consolidated Edison's eleven fossil fuel plants contributed in 1969 34 percent of the sulphur dioxides and 9.1 percent of the fly ash and other "particulate matter" that is so evident to the senses of sight and smell in New York City skies.

The United States Public Health Service estimates that in 1969 approximately 400,000 tons of sulphur dioxide and approximately 70,000 tons of "particulate matter" were emitted in New York City. Of that total, Con Ed's eleven fossil fuel plants accounted for ap-

Since by FPC calculations it will take 1.4 KWH of pumping energy supplied during non-peak periods to produce 1 KWH of project energy, Finding 71, it is obvious that additional air pollution will result if the pumping energy comes from those old fossil fuel plants.[19] If, as Finding 83 says, "[v]ery little city generated power will be used to pump Cornwall, particularly as Con Ed's interconnections and nuclear generated capacity increase with time," why would it not be proper to order that only the most efficient and least polluting fossil fuel generating units be utilized for pumping purposes now?[20] Indeed, Finding

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proximately 156,000 tons of sulphur dioxide and approximately 6,400 tons of fly ash and other particulates, primarily from the combustion of bituminous coal and residual oil for the generation of electricity. Although Con Ed's emissions are less than half of what they were a few years ago, and are expected to be even less with the planned elimination by 1972 of coal and a further reduction in sulphur content of residual oil, Con Ed is likely to continue to be a substantial contributor to air pollution in the City *so long as fossil fuel generating facilities comprise the greater part of its system.* Finding 77 (emphasis supplied).

19 If the energy necessary to pump Cornwall comes from polluting power plants in New York City that would otherwise be idle, little or nothing would be gained in reducing the air pollution problem. Based on the assumption that Cornwall would go into operation in 1972 a Staff study introduced in evidence showed that by 1980 approximately 89 percent of its pumping requirement could be met by virtually non-polluting sources of generation. Cornwall, to the extent that its water is not pumped by power from Con Ed low cost nuclear plants will be powered primarily from sources in areas adjacent to the Con Ed service area, and perhaps by imported Canadian hydroelectric power. Finding 82.

20 The FPC argues this is impractical, because electrical energy "flows through a system like Con Edison's in a unitary fashion." But surely the Commission's great expertise in transmission matters can come into play here: experience must have shown what the minimum safe loading parameters are for night-time base-load plants to assure the necessary system stability and to provide the necessary load service; operation above such limits, with possible exceptions for emergency situations, could be prohibited as a condition to the license.

84[21] seems to suggest that gas plants will be used for pumping but the order does not require their use. Of course, it may be that Consolidated Edison will be prohibited from using its old fossil fuel plants for pumping or otherwise under the Clean Air Amendments of 1970[22] to the Clean Air Act, 42 U.S.C. §§1857-1857*l*. But this does not absolve the FPC of its responsibilities to avoid adding to air pollution under its own governing Act or under NEPA, *supra* note 3. Consolidated Edison's own studies made in 1966-67 show that Storm King will result in more fossil fuel usage in New York City than would certain other alternatives. While this study has been questioned by the FPC itself, one of the justifications made by the company for the Storm King plant has been that it would permit otherwise idle large base-load plants in the city to generate at night.

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21 Assuming it is initially necessary to utilize some City generated power for pumping purposes it is unrealistic to suggest that the fossil fuel generating units which would be so utilized would not be the most efficient that the system has. The evidence is that the more efficient fossil fuel units, even at the 1.4 to 1 ratio, will utilize less fossil fuel per megawatt hour of generation for pumping off-peak hours than would be used by the less efficient units which, absent Cornwall, would have to be utilized to meet peak loads. To the degree that Con Ed does use City-generated power to pump water at Cornwall, which may occur to some extent during the first few years of the hydro project's operation, the record indicates that the type of fossil fuel used for the most part will probably be clean burning natural gas. During at least some parts of the year, Con Ed does not now, and probably will not, have enough natural gas available to generate sufficient power by gas turbines, steam generators, or otherwise [sic] to meet peak demand; it seems clear, however, that very substantial amounts of gas will be available for power generation during the night-time hours, even during the peak of the heating season. To the extent that this gas-generated power is not needed to meet the City's night base load, it may be used to pump Cornwall. Finding 84.

22 Pub. L. 91-604, 84 Stat. 1676 [see especially new Sec. 111(d)], 1 U.S. Code Cong. & Adm. News, 91st Cong., 2d Sess. 1964 (1970).

> Our customers' demands for electricity are high when they are awake and at work. Conversely, during the night time when most are sleeping, their need for electricity is at a low level—much below the capability of our most modern and efficient generating capacity. We plan to use this otherwise idle but efficient capacity to pump and store water in the upper reservoir at times of light customer demand. 32/4191.

Beyond this, we are told that Consolidated Edison generating facilities in the City produced 113,700 tons of nitrogen oxides, constituting about 38 per cent of total emissions of those compounds in the City.[23] Yet there is no mention of these in the Commission findings, except perhaps by implication in Finding 76.[24] To my mind, remand is required not only on the strength of the present record and *Scenic Hudson, supra*, for insufficiency of findings, but also in view of the changes which have occurred in Congressional policy on air pollution control,[25] and in

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23 See City Petition for Rehearing p. 19 (R. 276, 694). Nitrogen dioxide, one of the oxides, is apparently a component of smog, very injurious to the respiratory system; the City's Department of Air Resources estimates that nitrogen dioxide levels of 0.01 ppm (4 hr. average) for more than three days are dangerous to health, and levels of 0.05 ppm (4 hr. average) promote smog formations. Those levels are already exceeded in the city. With the thought that operation of the city-located plants will be in the relatively still night-time air, one has visions of economical and efficient pumping at Storm King while New Yorkers cough and gasp for breath.

24 The Commission's brief argues from the testimony of EPA witness Longaker that "the use of sulfur oxide served as a more important 'parameter or index of pollution from large stationary sources' than particulate emissions," as if to tell the court that the index of nitrogen oxide emission is unimportant. I take it that "particulate emissions" consist of fly ash, grit and solid matter, and may or may not include nitrogen oxides.

25 See note 22 *supra*.

plans to eliminate air pollution in New York City.[26] It is no answer to say that the City may invoke its own police power, if necessary, to regulate the dispersions from Consolidated Edison fossil fuel plants; Consolidated Edison would be the first to cite, indeed it already relies upon, *First Iowa Hydroelectric Coop.* v. *FPC*, 328 U.S. 152 (1946), to avoid undue inhibition of its rights under any license granted for Storm King.

The final matters which, to my mind, tip the scales for a reversal rather than simply a reversal and remand are two. The first concerns what may broadly be called aesthetics,[27] impairment by the project of the mountain's scenic grandeur. The commission's Finding 148 refers to the mountain "swallow[ing]" the "scar of the highway, the intrusive railroad structure and fills and tolerat[ing] both the barges and scows which pass by it and the thoughtless humans [sic] who visit it without seeing it . . . ." The finding goes on to say that just as the mountain swallows present day intrusions, "it will swallow the structures which will serve the needs of people for electric power." This argument borders on the outrageous; it can be used to justify every intrusion on nature from strip mining to ocean oil spills, *viz.*, "the Santa Barbara coastline already has an ocean-side highway, numerous offshore oil rigs, and a lot of flotsam and jetsam comes on to the beaches, etc. . . ." Two scenic wrongs do not necessarily make a right. On the basis of the commission's thesis, wherever you have one billboard you can put two, wherever you have

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26 The City argues, in its petition for rehearing filed September 18, 1970, that Consolidated Edison's 800 MW plant at Astoria additionally burdens city air above acceptable federal levels with both sulphur and nitrogen oxides, as well as particulates.

27 "It is not to be forgotten that the mountain we are talking about is 'unique,' 'a mountain which should be left alone . . . [and which is] awesome . . . monumental . . . .'" to quote some of the testimony duly recited in Commission Findings 143 and 148.

one overhead transmission line you can put another, you can add blight to blight to blight. That a responsible federal agency should advance that proposition in the form of a finding and in the teeth of the NEPA seems to me shocking. The commission's finding overlooks the fact that we are considering here a power station which above ground will consist of a concrete tailrace with abutments 32 feet high and 685 feet long, cutting back existing shore line from 195 to 260 feet,[28] exclusive of any access road.[29] This location, as the commission concedes, is on a small riverbottom foothill which "is visually a part of Storm King Mountain . . . ."[30] The mountain may "swallow" the project, but the concrete tailrace and abutments, as long as a good-sized football stadium—over an eighth of a mile—and three stories high, will surely be stuck in its craw.

The second point which tips the scales for reversal, I believe, is the commission's treatment of environmental impact, a treatment required under the National Environmental Policy Act of 1969 ("NEPA").[31] This Act requires "all agencies" to "include in every recommendation or report on . . . other major Federal actions significantly affecting the quality of the human environment, a detailed statement" on:

> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,

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28 Finding 191.

29 Finding 189.

30 Finding 156.

31 Pub. L. 91-190, 83 Stat. 852, 42 U.S.C.A. §§4321-47, eff. Jan. 1, 1970.

> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. Section 102(c), 42 U.S.C.A. §§4332(2)(C)(i)-(v).

In a very real sense this Act is a legislative response to and embodiment of the far-sighted and significant *Scenic Hudson* decision of this court[32] where the commission was directed in Judge Hays' words to "include as a basic concern the preservation of natural beauty," 354 F.2d at 624, and to give proper consideration to "the totality of a project's long-range effects." Id. at 620.

The commission properly included a series of eight findings (##211-18) purportedly dealing with NEPA, even though the record had closed before the Act became effective. In measuring those findings (and other findings) against the Act, to determine whether they constitute the detailed statement the Act requires, it seems to me we must bear in mind some of the declared goals of NEPA:

> In order to carry out the policy set forth in this chapter, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

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32 "Scenic Hudson, by placing a positive responsibility on the FPC to consider less environmentally damaging alternatives, laid a foundation for the obligation to develop alternatives imposed by NEPA." Council on Environmental Quality, Environmental Quality—The Second Annual Report 160 (Aug. 1971).

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences . . . . 42 U.S.C.A. §4331(b)(1)-(3).

As recently pointed out by the Court of Appeals for the District of Columbia, "the very purpose of NEPA was to tell federal agencies that environmental protection is as much a part of their responsibility as is protection and promotion of the industries they regulate. Whether or not the spectre of a national power crisis is as real as the commission apparently believes, it must not be used to create a blackout of environmental considerations in the agency review process." *Calvert Cliffs' Coordinating Committee, Inc.* v. *AEC*, 40 U.S.L.W. 2067 (D.C. Cir., July 23, 1971).[33]

Here the commission's Finding 217 says, incomprehensibly, "[a]ny short term adverse impact on the natural environment is more than offset by the enhancement of long term productivity which will result from the project". This is supposed to be a commission finding under NEPA, but I think the finding indicates that the commission did not read the Act very carefully. Section 102(2)(C)(iv), 42 U.S.C.A. §4332, requires a statement of "the relationship between local short-term *uses* of man's environment and the maintenance and enhancement of long-term productivity" (emphasis supplied). Not the short-term *impact* on the natural environment, but the short-term *uses* of it in relation to

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33 The Court was of course speaking of the AEC, but the language of the opinion is equally applicable to the FPC.

long-term productivity, is the statement required. Here we are considering permanent structures, a long-term and substantial use of an area of great natural beauty, "unique beauty," in the words of *Scenic Hudson, supra,* 354 F.2d at 613, involving an "irreversible and irretrievable commitment of resources" in the proposed project if licensed, to use the language of Section 102(C)(v) of NEPA.

Finding 213 says that "there is essentially no conflict concerning alternative uses of available resources because with the exception of the small part of the Black Rock Forest to be flooded by the reservoir practically none of the other parts of the project preclude alternative uses of available resources." This finding, as the brief of the Scenic Hudson Preservation Conference suggests, completely omits the conflicting alternative use of preserving the area free from any utility installations, tailraces, abutments and access roads.

In Finding 215, the commission concludes under NEPA, and the majority opinion here relies upon the finding, that none of the most likely proposed alternatives "could be sited within one hundred miles of New York City with any less physical impact on the environmental aspects of the affected area than the Cornwall project." In this day of high voltage transmission, what is so magic about one hundred miles?[34] Are all areas within one hundred miles of New York City to be treated alike for electric generating purposes? Or are they all to be made to look alike, so that we will no longer have to be concerned how they are treated?

Finding 217 says "[t]he resources which will be committed to this project are the acreage it will necessarily encompass and the fuel resources which will be committed to pumping energy" which are "many times over" outweighed by "the electric energy resources which will be generated by the commitment of such resources." But this

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34 See, *e.g.*, note 1 *supra.*

Finding overlooks both points mentioned earlier in this dissent, the risk to the Aqueduct and the increase, however temporary, of air pollution in the City to generate pumping power. To view plant-citing at Storm King Mountain as only a commitment of "acreage," [35] rather than as a commitment of a scenic wilderness area—albeit with some past intrusions and some present fairly easily rehabilatable defacements—to a massive, if partially hidden, power structure, is to beg the question of environmental preservation.

The extent to which the commission has in this proceeding too readily rubber-stamped Consolidated Edison's plans is indicated by its authorization of an alternative project within Palisades Interstate Park. The commission overruled its own examiner in this regard and the choice of an alternative site flies in the teeth of the Park Compact that the lands included within the Park "shall be used only for public park purposes." 50 Stat. 719, Section 3.

It would seem that the specific authority of Congress is needed for the development, transmission or utilization of power within the limits of a national park. See 16 U.S.C. §797(a).[36] *Citizens to Preserve Overton Park, Inc.* v. *Volpe*,

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35 See also Finding 188:

> . . . Limiting the external features at the powerhouse site to the portal entrance tailrace, and access road, totalling approximately 3 or 4 acres—out of Storm King's total of over 400 acres—should reduce to a minimum the visual impact on the scenic vistas of Storm King Mountain or the Highland Gorge of the Hudson River and thereby preclude any material scenic impairment or detriment.

See also Commission Brief p. 56.

36 . . . [N]o permit, license, lease, or authorization for dams, conduits, reservoirs, power houses, transmission lines, or other works for storage or carriage of water, or for the development, transmission or utilization of power within the limits . . . of any national park or monument shall be granted or made without specific authority of Congress. Congressional approval of the Palisades Interstate Park Compact by resolution on August 19, 1937 (50 Stat. 719) would seem to raise the Compact to the status of federal legislation. *Petty* v. *Tennessee-Missouri Bridge Comm'n*, 359 U.S. 275, 278 (1959); *Delaware River Joint Toll Bridge Comm'n* v. *Colburn*, 310 U.S. 419, 427 (1940).

401 U.S. 402, 413 (1971), speaks of "the few green havens that are public parks," albeit in another connection. I would protect those "few green havens." See *Scenic Hudson, supra*, quoting former Federal Power Commissioner Ross:

> [I]t appears obvious that had this area of the "Hudson Highlands" been declared a State or National park, that is, had the people in the area already spoken, we probably would have listened and might well have refused to license it. 345 F.2d at 614-15.

This being the second opportunity the commission has had to follow the mandate of this court, and it having failed to do so as I suggest above, I would conclude, as did then Circuit Judge Burger in an FCC case, "that it will serve no useful purpose to ask the Commission to reconsider the Examiner's actions and its own Decision and Order . . . ." *Office of Communication of the United Church of Christ* v. *FCC*, 425 F.2d 543, 550 (D.C.Cir. 1969). I would therefore reverse, without a remand.

APPENDIX B

Opinion and Order Issuing License Under Part I of the Federal Power Act

UNITED STATES OF AMERICA

FEDERAL POWER COMMISSION

License (Major)—Pumped Storage—Transmission Facilities—Preservation and Enhancement of Scenic Environment—Fish, Wildlife and Recreation—Historic Landmarks—Service (Reliability)—Air Pollution.

Before Commissioners:

John N. Nassikas, Chairman;
Lawrence J. O'Connor, Jr., Carl E. Bagge,
John A. Carver, Jr., and Albert B. Brooke, Jr.

Consolidated Edison Company of New York, Inc.	)	Project No. 2338

Opinion No. 584

(Issued August 19, 1970)

NASSIKAS, Chairman:

1. In this proceeding Consolidated Edison Company of New York, Inc. ("Applicant" or "Con Ed") is seeking a license under Section 4(e) of the Federal Power Act authorizing the construction, operation and maintenance of a pumped storage hydroelectric project of approximately 2,000 megawatts capacity, known as the Cornwall or Storm King Project, along and adjacent to the west bank

of the Hudson River approximately 40 miles north of New York City in the Village of Cornwall[1] and in the Towns of Cornwall and Highlands, Orange County, New York. Project transmission facilities would cross under the Hudson River and extend through portions of Putnam and Westchester Counties, New York.

2. As proposed, the project would utilize the waters of the Hudson River[2] for the purpose of generating electric power to be used on Applicant's electric system serving the metropolitan area of New York, including the five boroughs and a part of Westchester County, and other system purposes. The project including primary transmission facilities, would cost an estimated $234,370,000.

3. A fundamental issue in the proceeding is whether the public interest will be best served by development of the project site for the generation of electric power and for broad recreational and aesthetic use and enjoyment as proposed by Applicant, and thus whether Project No. 2338 is one which, in terms of Section 10(a) of the Federal Power Act,

> "... will be best adapted to a comprehensive plan for improving ... [the Hudson River] ... for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, and for other beneficial public uses, including recreational purposes; ...."

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[1] Approximately river mile 56.5.

[2] Since the Hudson River is a navigable water of the United States, the project is subject to the jurisdiction of this Commission.

The Court of Appeals Decision

4. An order issued by the Commission on March 9, 1965, licensing the Cornwall Project was set aside[3] by the United States Court of Appeals for the Second Circuit on December 29, 1965, and the case was remanded to the Commission for further proceedings. *Scenic Hudson Preservation Conference* v. *Federal Power Commission,* 354 F.2d 608 (2d Cir. 1965), *cert. denied,* 384 U.S. 941 (1966).

5. The Court of Appeals, in remanding the prior licensing order, held that the Commission failed to probe all feasible alternatives. It stated that the Commission has an affirmative duty to inquire into and consider all relevant facts.

6. The Court found the record deficient with regard to consideration of alternative power sources, fish protection devices, and underground transmission facilities. It ruled that on remand the Commission should not only take the whole fisheries question into consideration but the Commission's renewed proceedings "must include as a basic concern the preservation of natural beauty and of national historic shrines, keeping in mind that, in our affluent society, the cost of the project is only one of several factors to be considered." 354 F.2d at 624.

7. The decision of the Court of Appeals in *Scenic Hudson* was quickly recognized as a landmark in judicial regulation of the administrative process. The court's opinion

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[3] Negating also orders of May 6, 1965, denying expansion, rehearing and reopening of the proceedings, 33 FPC 964 and 965, and order of October 4, 1965, implementing the licensing order of March 9, 1965. 34 FPC 1083.

has frequently been cited for the proposition that the Commission is obliged to decide cases upon a full hearing record, and that if the record, as developed, does not satisfactorily explore all reasonable alternatives suggested in the proceedings, then the Commission is responsible for appropriately expanding the record.[4] The Scenic Hudson opinion creates the framework within which the competing social claims of an adequate and reliable supply of electric power and the protection of scenic resources and our natural environment must be resolved. The decision is also a significant addition to the law of standing to challenge administrative action.

8. It may fairly be said that *Scenic Hudson* has posed problems for the administrative process which are similar in scope and impact to those created by the earlier decision in *Ashbacker Radio Corp.* v. *FCC*, 326 U.S. 327 (1945). Certainly, the decision of the Court of Appeals has been the subject of widespread scholarly comment and concern.[5]

9. In considering the issues developed in the hearings on remand, we have striven to apply the principles enunciated by the Court of Appeals in *Scenic Hudson*.

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[4] *E.g., Citizens for Allegan County, Inc.* v. *FPC*, 414 F.2d 1125 (D.C. Cir. 1969); *Northern Natural Gas Co.* v. *FPC*, 399 F.2d 953 (D.C. Cir. 1968); *Freight Forwarders Institute* v. *United States*, 353 F. Supp. 460 (S.D.N.Y.); *Aberdeen & Rockford R.R.* v. *United States*, 270 F. Supp. 695 (E.D. La. 1967). See also, *Udall* v. *FPC*, 387 U.S. 428 (1967).

[5] See, *e.g., Symposium: Law and the Environment*, 55 Cornell L.R. 663 *et seq.* (1970); Seder, *Regulatory Activism—The Aftermath of Scenic Hudson*, published in 1969 Annual Report, Section of Public Utility Law, American Bar Association; *Recommendation F: Consideration of Alternatives in Licensing Proceedings*, Committee on Licenses and Authorizations, Administrative Conference of the United States (1969); Reich, *The Law of the Planned Society*, 75 Yale L.J. 1227 (1966).

10. In accordance with the remand of the Court of Appeals, the Commission ordered further proceedings before a Hearing Examiner in this matter.[6] In so doing it stated that the record in the first two hearings would be a part of the new hearing but all parties would be free to offer timely presentation of evidence on all matters relevant to the question whether a license should be granted.[7]

11. On August 6, 1968, the Presiding Examiner, Ewing G. Simpson, issued his Initial Decision in the Remanded Proceedings, which subject to review by the Commission, granted a license to Con Ed for the Cornwall pumped storage development.

12. On October 25, 1968, before any decision by the Commission, the City of New York, for the first time, petitioned the Commission for intervention and asked that the record be reopened to permit the introduction of evidence relating to the effect of the Cornwall project on the safety of its water supply from the Catskill Aqueduct.

13. By order issued November 19, 1968, the Commission granted the petition for leave to intervene and reopened the proceedings for the taking of evidence on the limited issue of the hazard to the Catskill Aqueduct, if any, by reason of the proposed location of the powerhouse at the Cornwall site and on an alternative powerhouse site proposed by the Federal Power Commission Staff. 40 FPC 1310.

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[6] 35 FPC 151.

[7] That the parties availed themselves of the opportunity to present evidence on all matters relevant may be judged from the fact that the reopened proceedings occupied 100 hearing days during which some 60 expert witnesses testified, some 675 exhibits were introduced, and in excess of 19,000 pages of record were amassed.

14. On December 23, 1969, the Presiding Examiner issued a Supplemental Initial Decision wherein he concluded that the Cornwall site did not present a hazard to the Aqueduct and that the alternative sites were not preferable. Subject to our review, the license previously authorized was affirmed with some amendments.

15. After the filing by various parties of briefs on exceptions and briefs opposing exceptions to both the Initial Decision of August 6, 1968, and the Supplemental Initial Decision of December 23, 1969, oral argument, pursuant to notice to all interested parties, was held before the Commission on May 4, 1970.

16. In order that the Commission might better evaluate and understand the evidence of record in this proceeding, by notice dated July 13, 1970, it ihformed all interested parties that the Commissioners would view the area of the proposed alternative powerhouse sites and the upper reservoir of the proposed Cornwall project on July 20, 1970. Counsel for each party to the proceeding were invited to be present during the Commission's viewing of the area but the notice stated that no counsel or party would be heard at any time during the visit to the area and that counsel must arrange their own transportation. The parties were further informed that the Commissioners might also view the area from the air or by boat and because of the space limitations no counsel would accompany the Commissioners during such part of the viewing.

17. The notice also stated that any counsel who wished to be present or file motions with respect to proposals or suggestions as to the area to be visited, or other matters relating to the viewing, should notify the Secretary of

the Commission or file such motions or suggestions by July 16, 1970.

18. Pursuant to such notice, intentions to accompany the Commission were filed by counsel for the Village of Cornwall, Scenic Hudson, Con Ed, John S. Tamsen, pro se, and representatives of the Palisades Interstate Park Commission and the City of New York Department of Water Resources. Counsel for the Town of Philipstown and Philipstown Citizens Association filed a statement of inability to accompany the Commissioners by reason of being on vacation and counsel for the Town of Cornwall filed a statement that he would not be present.

19. The Orange County Government; the Cornwall Taxpayers Water Protection Association, the Putnam County Historical Society, and the Hudson River Sloop Restoration, Inc., all offered assistance to the Commission during its viewing if so desired.

20. Scenic Hudson suggested that the Commissioners view all proposed alternative sites from both sides of the river as well as by boat. The Constitution Island Association suggested that the Commissioners examine the project as to aspects from Constitution Island and from the new state park on the east shore. The Putnam County Historical Society also requested that the Commissioners view the project site from the Hudson Highland State Park on the east side of the river. The Palisades Interstate Park Commission suggested that inspection be made from the bank of the river.

21. All suggestions for viewing were adopted by the Commission.

22. On July 20, 1970, the members of the Federal Power Commission began the viewing of the project area by an aerial flight in an observation-type airplane placed at their disposal by the U.S. Army.

23. The plane from Stewart Air Force Base approached the project area from the north, flying south along the Hudson River from the vicinity of Newburgh. It flew past Cornwall and Storm King Mountain down the river to West Point and then circled and flew north along the river past Storm King and Cornwall to the vicinity of New Windsor. The plane circled and flew south to Cold Spring and Nelsonville where it circled in the area between Nelsonville and McKeel Corners. Thereafter, the plane turned west, crossing the river above Constitution Island and then turned north roughly paralleling highway 9W past the proposed scenic overlook and then circled over the upper reservoir and Black Rock Forest. Finally, the plane returned to the river at approximately Site 2 where it turned north past Sites 2, 2-CT and 1 past Cornwall and New Windsor whereupon it flew back to Stewart Air Force Base. In the course of the flight, the Commission had the opportunity to view at low altitudes not only proposed alternative Sites 1, 2 and 2-CT, the scenic overlook and upper reservoir, but also the village of Cornwall and the Cornwall riverfront, Constitution Island, the eastern shore, Bull Mountain, Little Stony Point and Pollepel Island, Cold Spring and the Village of Nelsonville and vicinity, as well as the highways and railroads in the vicinity. It had an aerial view of the gorge approaching both from the north and the south.

24. After the aerial tour, the Commission returned to West Point where it was joined by counsel and representa-

tives of interested parties. By automobile caravan the group then proceeded from West Point via Storm King Highway, State Route 218, to two overlooks in the vicinity of Sites 2 and 2-CT where the Commissioners were afforded a view facing the river. From the higher overlook the Commissioners were also afforded a view south to the area of Sites 2-CT and 2. The caravan then proceeded to the area of Site 1 where the Commissioners were able to walk from the highway down a narrow path to Site 1. They then had a view east across the river at Storm King above. The party then proceeded to the upper reservoir area and Black Rock Forest where the Commissioners were able to view at the present water level the ridges forming the saddle for the proposed enlarged reservoir. Thereafter the parties returned to the Cornwall waterfront in the vicinity of the Cornwall Yacht Club and a derelict barge. At this point the Commissioners were afforded a view of Site 1 just to the south. The caravan then proceeded south along a narrow road parallel to and just inboard of the railroad tracks to the base of Storm King at Site 1. This afforded the Commissioners a river level view of the site. Continuing south along the river level road, the parties stopped at Sites 2-CT and 2. Thereupon the group continued on toward West Point for lunch.

25. After lunch the Commission and interested parties embarked on a launch provided by the United States Military Academy that proceeded up river from West Point past Constitution Island, Sites 2 and 2-CT, Cold Spring, Little Stony Point, Storm King, Cornwall and Pollepel Island. The launch then turned toward the Cornwall riverfront and proceeded south down river to West Point affording further views of Cornwall, Storm King, Sites 1,

2-CT and 2. The trip up and down the river also afforded the Commission a view of the Highland Gorge at river level from both the south and the north. In large measure, the river boat trip gave a view of the gorge and the project area complementing the earlier flight up and down the river. Upon docking, the parties proceeded by car across the Bear Mountain Bridge to the east side of the river to the vicinity of the Catskill Aqueduct pumping station at Breakneck Point. The Commission was thus afforded two river level views from the east bank of the river.

26. From the east bank of the river, the caravan then proceeded south to Cold Spring where it turned east on Route 301 and proceeded through the Village of Nelsonville to the intersection of Route 9 at McKeel Corners. It then returned along Route 301 to Cold Spring where the tour terminated. In proceeding from Cold Spring to McKeel Corners and back to Cold Spring, the Commissioners had an opportunity to view from the ground the area the transmission line will traverse after it leaves Cornwall East.

The Consolidated Edison System

27. The Con Ed System provides electric service in New York City's five boroughs and part of the Westchester County. It presently consists of eleven steam-electric plants, one nuclear-electric unit, and a number of small gas turbine generating units. It is in the process of installing an additional conventionally fueled generating unit at Arthur Kill, as well as additions to its nuclear unit at Indian Point, and more gas turbines.

28. At the end of 1969 Con Ed had a net dependable installed generating capacity of 8,165 mw. In 1970, by the planned addition of 1,088 mw of gas turbine generation and 873 mw of nuclear generation, the system's capacity should be 10,126 mw. In addition, the company has firm contracts with other utilities for the purchase of 520 mw during 1970.

29. The electric loads of the Con Ed System have been growing at a rather uniform rate and the annual peak loads have shifted from the winter season to the summer season. Much of the generating capacity on the Con Ed system is relatively old and by 1978 over 2,000 mw of such capacity is due to be retired.[8] Con Ed estimates its summer peak load to be 10,125 mw in 1977 and 10,850 mw in 1979.

30. Con Ed is a member of the New York Power Pool and this pool is presently dispatched in two segments comprised of the Southeast New York State Companies and the Upstate New York Interconnected Systems.

31. Con Ed is also interconnected with neighboring electric systems. The present principal interconnections are with the Niagara Mohawk Power Corporation, at 345 kv, and with the Connecticut Light and Power Company at 345 kv, which allow a total maximum reliable capacity of about 1,000 mw. It is also interconnected via Staten Island with the P-J-M Pool through a 138 kv circuit which has a capacity of about 350 mw. This connection is being converted to 230 kv and designed to have a capacity of about

[8] See report by the Federal Power Commission, a review of Consolidated Edison Company, December 1969, Table 7, p. 45.

600 mw. In addition, a connection is being made with P-J-M via the Indian Point-Buchanan area which will have a capacity of about 1,000 mw. With the completion of this connection the Consolidated Edison system will have a capacity of 2,500 mw in transmission facilities connected to its larger neighbors.

General Description of the Project

32. The installed horsepower capacity of the proposed Project for the purpose of computing the capacity component of the administrative annual charges to be paid under the license for the Project and for the cost of administration of Part I of the Federal Power Act is 2,667,000 horsepower.

33. The principal project works are an upper reservoir about one mile from the river in the Towns of Cornwall and Highlands, Orange County, New York; a concrete-lined pressure tunnel to transport water between the upper reservoir and an underground power station located adjacent to the west bank of the Hudson River; the underground power station in part in the Town and in part in the Village of Cornwall containing eight reversible pump-turbines; the Projects' primary transmission facilities, comprising two 345 kv transmission circuits leading from the power station, under the Hudson River, through Putnam and Westchester Counties, New York to a point of interconnection with the Applicant's primary transmission system at its Sprain Brook substation in the City of Yonkers, Westchester County, New York; and certain recreational facilities.

34. The project upper reservoir will be about 10,000 feet south and west of the powerhouse, located in a naturally formed basin in the Hudson Highlands between Mt. Misery, White Horse Mountain, Hill of Pines, and surrounding ridges. The reservoir will have a usable capacity of about 25,000 acre-feet and a surface area of 240 acres when filled to its maximum elevation of 1160 feet above mean sea level.

35. The lower reservoir will be the Hudson River which, at Cornwall, is essentially an estuary of the Atlantic Ocean with semidiurnal tides and widths approximating a mile. Thus, the lower reservoir has unlimited storage capacity with water surface at about elevation zero.

36. An ungated, circular intake in the upper reservoir bottom will exit into a concrete-lined pressure tunnel, 40 feet inside diameter and about 10,000 feet long, leading to a concrete-lined subsurface manifold, and thence to eight steel-lined penstocks, reinforced to accommodate a maximum surface elevation in the upper reservoir to 1,210 feet, and to 96 inch diameter, oil operated spherical valves at the scroll case of the turbo-generator units in the power station. Water will be conveyed through the tunnel between the upper reservoir and the power station.

37. The power station includes three underground chambers: a turbo-generator gallery, a transformer gallery, and a gate gallery.

38. The turbo-generator gallery will enclose eight generator-motor, Francis type, pump-turbine units and associated electrical and mechanical equipment. The units generally would act as motor-pumps and utilize off-peak

energy furnished from other system generating facilities to pump water from the Hudson River to the upper reservoir. When needed to produce peak power, the units would reverse direction of rotation and act as turbine-generators furnishing energy by using water released from the upper reservoir through the turbines and discharging to the Hudson River. This cycle of operation would be repeated daily. The plant could be used for spinning reserve when partially loaded or the generating units could be kept spinning in air to provide load protection for the system's load and for other loads in the area.

39. The transformer gallery will enclose eight transformers, switching gear, circuit breakers, and associated electrical equipment. The gate gallery will enclose draft tube gates and associated equipment. Eight discharge tunnels will convey water between each turbine and an open tailrace leading to the Hudson River.

40. The project provides for the installation of a fish protective device located in front of the tailrace-intake.

41. Project transmission facilities will consist of two 345 kv circuits made up of four 345 kv pipe-type submarine cable installations and two spare pipes beneath the bed of the Hudson River, continuing underground on the east side of the Hudson River to a project terminal point and thereafter by means of two overhead 345 kv circuits, installed on a single towerline, running generally easterly to a switching station at a point of interconnection with applicant's existing Pleasant Valley-Millwood right of way and continuing south to its Sprain Brook Substation in Yonkers, Westchester County, New York.

42. The proposed project works include a visitors information center and other recreational facilities in be constructed at the power station site and occupying some 60 acres, a scenic overlook approximately one mile southwest and at a much higher elevation than the power station site, and riverfront properties extending about a mile north and west of the Cornwall power station site which will serve as a spoil area for rock excavated during project construction and then will be filled, compacted, landscaped for park and recreational use, and conveyed to the Village of Cornwall.

Public Convenience and Necessity

43. The weighing of social values required by the concept of the public convenience and necessity in this case involves on the one hand the alleged greater and much needed reliability, economic savings, and anti-air pollution benefits which this project offers compared with any feasible alternative, and on the other hand the alleged aesthetic and environmental detriment the project would impose on an area of great scenic, natural and historic value.

44. Simply put, the issue is whether the project offers substantially more reliable electric service as well as cheaper electricity generated in a cleaner manner than any other feasible alternative and, if so, whether the project will create detrimental aesthetic and environmental conditions of such degree as to lead on balance to a judgment that the public convenience and necessity would be better served by denying the application herein.

45. In accordance with the mandate of the Court of Appeals and the Commission's planning responsibility

under Section 10(a) of the Federal Power Act, and recognizing an affirmative duty to inquire into all relevant facts, our ultimate decision in this case is not the resolution of litigated issues formulated by the parties but rather the determination of public policy by considering "the totality of the project's immediate and long range effects" consistent with the public interest. 354 F.2d 620.

Reliability

46. As a nation and a society we have become almost totally reliant on electric power and on the systems that provide it. The Northeast blackout in November 1965—affecting about 30 million persons in six states and in Canada—was a spectacular reminder of how vital an uninterrupted flow of electric power is to their safety, defense, health and convenience. Subsequent power failures of lesser magnitude elsewhere in the country have intensified everyone's concern. Future power interruptions might have disastrous consequences and it is inconceivable that we should not carefully consider licensing those projects best designed to prevent their occurrence.

47. In the Commission's report to the President on the *Prevention of Power Failures* (1967), reliability was defined as meaning "the ability of a utility system or group of systems to maintain the supply of power. Reliability is gauged by the infrequency of interruptions, the size of the area affected and the quickness with which the bulk power supply is restored if interrupted."

48. Preventing major power failures, or limiting their possible scope, requires in the first instance adequate

power supply facilities capable of a quick sustained response. Only then can intersystem ties and emergency load reductions be effective. No matter how great the capacity of intersystem ties, the possibility of interruption of such ties and the isolation which can result therefrom requires that the isolated system or systems be capable of recovering the frequency and providing the generation for the essential load. The ability of a system to do so is measured by its response capability. Of course, any enhancement of the overall reliability of the power supply of the Con Ed system would also contribute to the reliability of other systems to which it is interconnected.

49. To prevent a system collapse during disturbances, electric systems maintain "spinning reserve," *i.e.*, maintain generating units actually spinning synchronized to the system, but generating less than full capacity. The unutilized generating capacity on synchronized spinning units is the "spinning reserve on the system."

50. The inertia of operating units and the availability of interconnection to other electric systems may cushion the shock of emergencies, but these elements provide only temporary relief. Thereafter, maintenance of service requires that a loss of generation be replaced from spinning reserve and additional generating capacity. The utilization of interconnections for this purpose during emergencies depends upon the availability of capacity at one end of the interconnections which is surplus to the load at the other end; *i.e.*, there must be spinning reserve with fast response somewhere in the interconnected system for the interconnection to provide reliable help in emergencies. To avoid undue risk of severing the interconnection as a result of

overload conditions a generation-deficient system may place reliance upon the spinning reserve of other systems for a few minutes at most. Further, if for any one of a variety of possible causes a separation does occur the separated system must depend entirely upon its own spinning reserve if it is to maintain service. Either condition requires the presence of quick response spinning reserve on the system suffering the emergency.

51. In a major emergency, accompanied by separation of systems, the first two minutes are critical. The northeastern power failure revealed that operation below normal frequency for a period in excess of two minutes resulted in an inability of the electric systems to recover and attain normal operations. The value of having spinning reserve capable of being fully effective in two minutes or less is clearly demonstrated. In spite of the fact that substantially more spinning reserve was available than the amount of deficiency in power supply, the inability of such spinning reserve to pick up load fast enough was the controlling factor. It appears from the evidence that to be effective in such an event 70 to 75% of the spinning reserve should be synchronized and available in 30 seconds to one minute, with all of the reserve available within two minutes. From the record we believe that if Cornwall or a pumped storage equivalent with its very fast pick-up characteristics had been available the blackout of 1965 might have been avoided.

52. When a unit is partially loaded and generating below maximum capability, a proportionate spinning reserve is available in an amount equivalent to the difference between maximum capability and actual kilowatt generation.

In a pumped storage facility such as Cornwall, Con Ed projects a generation of 1250 mw and a spinning reserve of 750 mw. However, because pumped storage projects have a great capability in the matter of providing a highly responsive spinning reserve, Cornwall could be operated so as to provide as much as 1000 mw of spinning reserve. By comparison, because of high fuel costs and relatively low thermal efficiency, gas turbines are generally operated at full load or not at all. To minimize the high operating costs, they could be expected to be spinning at part load for a period of not more than 12 hours a day and at other times would be available only from a cold start which represents a limitation on quick response availability.

53. It is beyond dispute that electrical energy is the lifeline of the city. Without it, no water could be pumped in many of its multi-storied buildings, subways and elevators could not operate, its refrigeration and food storage facilities would collapse, its streets would become dark and dangerous, its commerce stagnant, and the very health, safety and welfare of its occupants untenable. Having said that, it must not be forgotten that the hand-maiden of electrical energy is reliability. Reliability, essentially, is the constant ability of a system to meet the demands which are placed upon it and the ability to respond to and recover from emergency situations. No method of generating electrical energy per kilowatt of designed capacity would appear to be so well adapted to meeting peak demands and insuring an ability to provide quickly electrical energy necessary to respond to and recover from emergency situations as a hydroelectric facility. The dependability of such facility to perform its designed functions also exceeds any other means or method for electric generation.

54. Given the problem of improving the reliability of power supply for the densely populated load area of the Con Ed system a great deal of testimony in the proceeding was devoted to the load pick-up and load-retention characteristics of the various types of generating capacity. The record establishes, and the Examiner so found, that the types of generating capacity which have the response characteristics so necessary and basic to the concept of reliability of power supply are pumped storage units and gas turbine units if operated at part load.

55. Pumped storage developments operate at relatively slow speeds and their components are massive and hence highly reliable. They are excellent for reserve purposes since they have a fast pickup characteristic and can reach full power from half load in 10 seconds. They are capable of operating over a broad range of loadings and they have the ability to take on load and sustain load when substantial decreases in frequency take place.

56. Because of the nature of their design they are capable of storing a relatively large amount of energy of rotation per unit of generating capacity and thus they are inherently capable of making a substantial contribution to the system, particularly when it becomes isolated. Their almost continuous availability is a particularly unique asset because pumped storage projects have relatively low outage rates compared to other types of generating capacity.[9]

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[9] The National Power Survey indicates hydroelectric outage rates to be one-fourth those for steam units, National Power Survey, Federal Power Commission, 1964, Part I, Chapter 14, page 187.

57. Pumped storage generating units, when partly loaded, provide the greatest degree of stability to the network. Even when spinning in air they are available in less than one minute and thus make substantially the same contribution to reliability as partly loaded steam-electric generating units. For comparative purposes, if Cornwall were half loaded it would take the operation of 1.6 times as much gas turbine generating capacity spinning partly loaded to provide the same spinning inertial contribution to reliability as Cornwall.

58. Should an emergency arise during the pumping cycle, the pumping generation could be immediately devoted to load pick up, giving other units necessary time in which to pick up load. In addition, Cornwall with its quick response capability would also be able to contribute to load within a very short time after pumping was halted.

59. Gas turbine generating units, when spinning, have a fast pick up characteristic which is almost as good as that of pumped storage units. However, the gas turbine units can only be brought to full operation from a cold start in the range of 3 minutes and ten seconds, to 4 minutes. Such capability is very valuable when needed to replace generating capacity which may be in trouble due to mechanical problems but from a cold start the time lag is too great to qualify these units as spinning reserve.

60. Gas turbine generating units have a relatively low storage of rotational energy per kilowatt of capacity, and in this respect they have a much smaller cushioning effect on disturbances than do any other type of generating capacity. If they should be knocked out of service due to

outage of a transmission line or operation of control facilities they could not be brought back in time to be useful during an emergency. The reconnecting and reloading time to full output may extend anywhere from 10 minutes to 30 minutes, depending upon the operational sequence designed into the gas turbine generating unit.

61. Nuclear units have relatively slow response characteristics. Because they have relatively high capital costs and very low fuel costs, they must be operated as many hours as possible to be justified economically. This makes them more desirable for base load operation rather than for peaking purposes. However, nuclear plants are excellent complements to peaking power sources and in combination with such sources can contribute greatly to the economy of the system's power supply and somewhat to reliability. As nuclear units move up in the load curve and consequently operate on block load during the so-called on-peak hours they have available energy during off-peak hours which is useful and economical for providing pumping energy to pumped storage developments. This indicates that in those systems that have pumped storage more nuclear capacity may be justified economically than those systems which do not have pumped storage developments. Thus systems with pumped storage are in a position to utilize to a greater extent the low cost energy obtained from nuclear sources.

62. Nuclear-electric generating units have a relatively slow load pick-up characteristic, comparable to that of large fossil-fueled steam-electric generating units. For load protection service, nuclear units are not comparable to pumped storage hydro units or gas turbines. The forced

outage rate and the scheduled outage rate for nuclear-electric generating units appears to be comparable to those for large steam-electric generating units even though the experience record for nuclear plants in large sizes is still fragmentary.

63. A nuclear-gas turbine combination in terms of reliability suffers from the shortcomings inherent in its components, that is, unless the gas turbine units are spinning they cannot be brought into operation soon enough to meet emergencies and the nuclear component has relatively slow response characteristics which when combined with the forced outage reduces the reliability quotient of such a combination.

64. Large conventional fossil-fueled steam-electric generating units have a relatively slow rate of response because of the thermal stress limits which are established to prevent the equipment from being damaged. As a consequence of response, operating, and energy storage limitations, large steam-electric generating units are not particularly useful as spinning reserve.

65. Mine-mouth steam-electric plants having low energy production costs usually are located in areas remote from load centers, requiring long distance transmission at extra high voltages.[10] Their inertial characteristics are similar to those of large conventional base load steam-electric

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[10] Any mine-mouth facility serving Con Ed would not only have to be located in Pennsylvania or West Virginia but as the transmission lines approached or crossed the urban areas west of the City extensive undergrounding would be necessary.

plants near load centers and their response characteristics are also comparable. Because of the availability of low-cost fuel, mine-mouth plants are usually fully loaded and are seldom, if ever, operated to provide any spinning reserve. Mine-mouth plants would not be used to provide load protection or spinning reserves. Because of their distance from load centers such plants are particularly vulnerable to separation in the event of system disturbances or emergencies.

66. Although steam-electric generating units can be simplified in design to provide low capital cost, higher energy cost peaking capacity for use during a few hours per day, they can still be brought up to speed, synchronized, and fully loaded only after some 30 minutes. The evidence is that their load pick-up characteristics are inferior to both gas turbines and to pumped storage.

67. When supplying spinning reserve, peaking steam-electric units, base load steam-electric units, and nuclear electric generating units, because of the nature of their steam cycle, have a much slower initial contribution to power supply for purposes of reliability. Also, they cannot sustain their initial rate of supply because of the need to replenish the steam at the proper temperature and pressure following the initial contribution to the electric system. Also, if gas turbines are brought on a line from a cold start during a major disturbance their contributions would not be effective in time to assist in maintaining electric service.

68. The effect of the relative load pick-up and associated operating characteristics of the various types of power

supply is even more evident when there is system separation because the cushioning effect of interconnected systems is no longer available.

69. In addition to the fast load pick-up characteristics, various types of power supply sources may be compared with respect to their relative inertial contributions to system stability. With respect to inertial effects, the pumped storage generating units would make the greatest contribution because they would have the largest amount of stored energy per unit of capacity. Next would come the base load steam units, base load nuclear units, peaking steam units, and last, gas turbines.

Peaking Power

70. Cornwall is designed to deliver 2 million kilowatts or somewhat more on peak, which would approximate 20 percent of Con Ed's estimated 1976 peaking requirements. By utilizing energy surplus to system needs during nighttime and week-ends, or purchasing low cost surplus energy from interconnected systems, Cornwall is designed to convert low cost surplus energy into high value energy during periods of peak demand.

71. Losses attributable to pumping and generating result in approximately one kilowatt hour of energy generated by the project for each 1.4 kilowatt hours of pumping energy supplied during non-peak periods. However, the surplus energy which will be available for pumping during off-peak periods would be so inexpensive that the project generated energy would be less costly than the energy supplied by plants which might otherwise be used for peaking, notwithstanding such 1.4 to 1 ratio.

72. The calculation of the 1.4 to 1 ratio is based upon a study of the pertinent operating efficiencies based on model test data. These data, together with projection of system power supply and loads as well as information as to plant auxiliary requirements, show a range of efficiencies for the Cornwall plant of from 70.9% (1.406) to 71.6% (1.396 to 1).

73. Cornwall generated energy cost at a 1.4 ratio would be lower than that from any peaking alternative, since it will primarily cycle nuclear energy having an incremental cost of less than 1.4 mills per kwh for a total of approximately 1.96 mills per kwh. The evidence shows production costs from gas turbine plants to be 9.98 mills per kwh, while peaking steam units would cost 5.15 mills per kilowatt hour.

74. We find that pumped storage produces superior peaking power and greater reliability than any alternative available to the Con Ed system.

Effect of Cornwall Project and Alternatives on Air Pollution in New York City

75. New York City is subject to pollutants emitted in both a gaseous and particulate form from a wide variety of sources, including power generating plants.

76. It should be noted that serious air pollution episodes resulting from inversions have occurred in New York City in 1953, 1963, and 1966. An "inversion" occurs in periods of little or no wind when a layer of cold air covers a layer of warm air to prevent it from rising. Without an upward current of air or wind the pollutants cannot be dispersed.

As a result, the pollutants mass in a thickening stagnant cloud above the area affected and they diffuse down to the ground line. While inversions are not very frequent, they can last for several days and can be present day and night. A typical episode, to which are attributed 168 deaths, occurred during the Thanksgiving holiday, November 22 to 26, 1966.

77. The United States Public Health Service estimates that in 1969 approximately 400,000 tons of sulphur dioxide and approximately 70,000 tons of "particulate matter" were emitted in New York City. Of that total, Con Ed's eleven fossil fuel plants accounted for approximately 156,000 tons of sulphur dioxide and approximately 6,400 tons of fly ash and other particulates, primarily from the combustion of bituminous coal and residual oil for the generation of electricity. Although Con Ed's emissions are less than half of what they were a few years ago, and are expected to be even less with the planned elimination by 1972 of coal and a further reduction in sulphur content of residual oil, Con Ed is likely to continue to be a substantial contributor to air pollution in the City so long as fossil fuel generating facilities comprise the greater part of its system.

78. The record, with respect to the effect of the Cornwall project or the various alternatives upon air pollution in New York City, was developed along two lines. The first is on the pollution contribution potential of the Cornwall project as a given method of generating power compared to alternative methods of electric generation, and the second is on how Cornwall or a particular alternative operating on the Con Ed system would affect Con Ed's total

contribution to air pollution in New York City, measured in terms of total system fossil fuel burning. The first approach involved the identification of sources of pumping power and their pollution contribution in the case of Cornwall, itself a non-polluting source of generation, and the pollution contribution of the various alternatives. The second entailed the far more complex examination of the entire Con Ed system, including the computation of projected daily fossil fuel consumption by each fossil fuel plant in the system, based on projected system designs and methods of operation with Cornwall and the other alternatives.

79. Commercially proven technology for control of sulphur oxides from combustion processes has not yet been demonstrated. The only method now available to reduce sulphur dioxide pollution is the use of low-sulphur fuels, the supplies of which are limited and costly. The increased demand and consumption of electricity expected during the next 20 or 30 years requires utilization of that method of generation which meets the needs of non-polluting reliability. Since utilization of electricity is not uniform or constant the anti-polluting reliability of the system must be designed within the framework of peaking requirements.

80. Nuclear generation is least polluting but is not suitable for peaking purposes whereas pumped storage generation is an excellent means of generating electricity for peaking requirements.

81. Pumped storage is also a source of anti-polluting generation in that peaking energy is supplied pollution free and pumping energy requirements provide a demand which permits nuclear and fossil fuel generation units to operate

during night hours more effectively. This is turn provides the economic and ecological incentive for construction of such units thereby eliminating the need to continue operating the less efficient and more polluting fossil fuel installations.

82. If the energy necessary to pump Cornwall comes from polluting power plants in New York City that would otherwise be idle, little or nothing would be gained in reducing the air pollution problem. Based on the assumption that Cornwall would go into operation in 1972 a Staff study introduced in evidence showed that by 1980 approximately 89 percent of its pumping requirement could be met by virtually non-polluting sources of generation. Cornwall, to the extent that its water is not pumped by power from Con Ed low cost nuclear plants will be powered primarily from sources in areas adjacent to the Con Ed service area, and perhaps by imported Canadian hydroelectric power.

83. That water for Cornwall will normally be pumped by use of electric energy from nonpolluting sources is based on economic realities. Most of Con Ed's present generating facilities are relatively inefficient and burn relatively expensive fossil fuel. It is obvious that the oldest and most inefficient of these steam-electric plants must be replaced as soon as possible. The evidence is that the Cornwall project will permit a more rapid replacement of these plants by nuclear plants. This is because large nuclear plants are economical when they are used continually near their maximum power rating. The demand on the power system on the other hand is far from uniform, having pronounced diurnal peaks above the base load with an amplitude comparable to the base load. A pump storage plant like Corn-

wall provides the means by which the otherwise incompatible requirements of efficient nuclear plant operation and fluctuating power demand can be meshed. The availability of a Cornwall in the system as a reserve for satisfying the peak-load requirements permits the replacement of the old inefficient plants in the City. This in turn leads to a further reduction of pollutants as well as to economic benefits. Very little City-generated power will be used to pump Cornwall, particularly as Con Ed's interconnections and nuclear generated capacity increase with time.

84. Assuming it is initially necessary to utilize some City generated power for pumping purposes it is unrealistic to suggest that the fossil fuel generating units which would be so utilized would not be the most efficient that the system has. The evidence is that the more efficient fossil fuel units, even at the 1.4 to 1 ratio, will utilize less fossil fuel per megawatt hour of generation for pumping off-peak hours than would be used by the less efficient units which, absent Cornwall, would have to be utilized to meet peak loads. To the degree that Con Ed does use City-generated power to pump water at Cornwall, which may occur to some extent during the first few years of the hydro project's operation, the record indicates that the type of fossil fuel used for the most part will probably be clean burning natural gas. During at least some parts of the year, Con Ed does not now, and probably will not, have enough natural gas available to generate sufficient power by gas turbines, steam generators, or otherwise to meet peak demand; it seems clear, however, that very substantial amounts of gas will be available for power generation during the night-time hours, even during the peak of the heat-

ing season. To the extent that this gas-generated power is not needed to meet the City's night base load, it may be used to pump Cornwall.

85. Gas turbines operating either on natural gas or kerosene emit a relatively small proportion of sulphur pollutants.

86. Results of tests by Pratt & Whitney on gas turbine exhaust emissions indicate however, that operation at low load with natural gas produces significant quantities of carbon monoxide and unburned natural gas (methane). These emissions consist of approximately one ton of carbon monoxide per hour and about 0.7 ton of methane per hour for each gas turbine unit. On this basis, operation as spinning reserve on the Con Ed system of one gas turbine unit on natural gas fuel for a daily peak period of twelve consecutive hours would produce twelve tons of carbon monoxide. Eight gas turbine units operating together in a similar fashion would produce 96 tons of carbon monoxide in a twelve hour period. Unlike sulphur dioxide, whose effect on human health has not been precisely ascertained, the lethal effects of carbon monoxide are well known.

Fossil Fuel Consumption with Cornwall and Various Alternatives

87. Although Scenic Hudson contends that a combination of nuclear generation and gas turbines would afford greater anti-air pollution benefits than Cornwall, the Staff study shows that this would be true only in Cornwall's early years. By 1980 after 8 years of operation less sulphur dioxide would be produced by a system having Cornwall available for peaking purposes.

88. The Staff study showed that in 1975 the Con. Ed system with Cornwall would require 952,000 tons of coal and oil fuel (producing 15,810 tons of sulphur dioxide) less than the system with the all gas turbine alternative, but 883,000 tons (producing 14,500 tons of sulphur dioxide) more than the system with the nuclear-gas turbine alternative. In 1980, however, the system with Cornwall would require 1,559,000 tons in coal and oil fuel (producing 25,800 tons of sulphur dioxide) less than the all gas turbine alternative and 594,000 tons (producing 9,900 tons of sulphur dioxide) less than with the nuclear-gas turbine alternative. Thus by 1980 the system with Cornwall would require less coal and oil than the system with the nuclear-gas turbine alternative, the reverse of the situation in 1975. By 1980 the Con Ed system with Cornwall would be surpassed only by the system with an all nuclear alternative[11] in the reduction of fossil fuel burning in New York City.

89. The record contains a memorandum of understanding and report by Con Ed to the Mayor of New York City whereby Con Ed undertook to reduce sulphur dioxides from its plants and reduce the sulphur content of its fuels. Pursuant to that program Con Ed plans to eliminate coal burning by 1972 and hopes to switch from fuel oil with a 1 percent sulphur content to a lower sulphur content of .3 percent. Staff's study and conclusion that having Cornwall in the system would ultimately result in less polluting peaking generation than would otherwise be possible is still valid although it was premised on a combination of coal and fuel oil having a higher sulphur dioxide production. That is so because, while the amount of sulphur

[11] Primarily, a base load source of generation which would still leave a system requirement for spinning reserve and peaking power.

pollutants would be less than Staff's figures, the relative pattern of volume of pollutants with respect to each of the alternatives as set forth in Staff's study would remain the same. Thus while the polluting aspects of non-Cornwall alternative peaking generation would be reduced, so also would be the polluting aspects of Cornwall pumping generation.

90. Scenic Hudson questions seriously the reasonableness of the load estimates and the schedule of additions of nuclear electric generating capacity used by the Staff in its studies. Assuming construction time of five years and allowing approximately two years for final court review, the Cornwall project is not likely to go into operation before 1977 to 1978 at which time at least 3000 megawatts of nuclear electric capacity would be in operation on the Con Ed system. By 1985 or 1986 eight years later, the Con Ed system would have about as much nuclear electric generating capacity as used by Staff in its studies and the cross-over point where the Cornwall project would make a substantial contribution to air pollution over any other alternative would still be 8 years after initial operation as shown by Staff studies. Hence, despite the time hiatus, we find the premise of Staff's study to be sound.

91. Although the Cornwall project would generally be beneficial to air pollution abatement, it would not make as great a quantitative reduction in total amount of coal and oil burned over the 20 year period as would an all nuclear alternative, because the nuclear alternative would be used primarily as "base load" capacity to replace a greater number of kilowatt hours of fossil generation. However, the Cornwall project would provide greater flexibility dur-

ing the periods of temperature inversion when the air pollution problem is most acute; the Cornwall project will also allow for fewer starts and less rapid load changes on the fossil fuel units, which will aid in control of emissions from such units.

92. On the basis of the foregoing we conclude that except for an all nuclear alternative, which does not satisfy the peaking and reliability needs, the Cornwall project will permit electric generation by the Con Ed system with less air pollution than the system would otherwise generate through any other feasible alternative.

Alternatives

93. Responding to the Court of Appeals' criticism that the Commission "failed to make a thorough study of possible alternatives to the Storm King Project," the remanded hearings extensively considered the feasibility of gas turbines, nuclear units, a combination of nuclear and gas turbine capacity, purchased power, other hydroelectric sites, conventional base load fossil fueled units at load center and mine-mouth, combinations of fossil fueled and nuclear units, and exotic or experimental forms of generation. Of these, only an all gas turbine facility or a combination nuclear-gas turbine facility were seriously advanced as potentially feasible alternatives.

Gas Turbines

94. The substantial record evidence regarding the gas turbine alternative on which we base our decision establishes that gas turbine units are not a feasible alternative

to Cornwall. The evidence shows that gas turbines are less reliable for emergency purposes than a pumped storage project, and that the capital and operating costs are higher.

95. The basic gas turbine electric generator considered by all parties as a proposed alternative is manufactured by the Pratt & Whitney Aircraft Division of United Aircraft Corp. (P & W).[12] It consists of eight jet engines arranged in pairs which drive four turbines connected to a shaft which drives a standard electric generator. The only unit of this type in operation at the time of the hearings was one run by Public Service Electric and Gas Company of New Jersey (Public Service) at Sewaren, N. J. The record makes constant reference to the Sewaren unit.

96. The capital costs of gas turbines will vary somewhat depending on location (affecting transmission and sound proofing) and with fuel used. Con Ed based its capital cost study on 15 kerosene fueled units because it asserts such fuel provides the least penalty in terms of reliability and air pollution. Using this basis, Con Ed estimated that to provide a gas turbine capacity equivalent to Cornwall would cost $223,000,000. This cost must be measured against a cost for Cornwall then estimated by Con Ed to be approximately $185,000,000. Since then estimated costs for both Cornwall and alternatives have increased.

97. In terms of kerosene fuel costs Con Ed estimated 76¢ per million Btu which, excluding start-up costs, results

[12] Although commonly referred to as a gas turbine unit, it also may be fueled by kerosene or a combination of kerosene and natural gas, alternatively.

in a fuel cost of over 11 mills per kwh. It says this compares with Cornwall's energy cost of less than 2 mills per kwh if recycling off-peak nuclear generation from Indian Point and approximately 5 mills if pumping is supplied by modern fossil units in the system.

98. Scenic Hudson initially made two proposals for gas turbine alternatives. One consisted of 13 Sewaren-type all gas turbine units, and the second used a combination of six gas turbines and a 1000 mw nuclear plant. Witness Lurkis estimated a total capital cost per turbine unit at $10,250,000. This cost did not include the cost of a compressor if gas fueled units are utilized. Unless natural gas is supplied directly from a high pressure interstate pipeline, as Sewaren, a compressor is necessary to maintain the 300 psig pressure requirement which Pratt & Whitney specified to insure proper operation of the jet engines.

99. In the rebuttal phase, Scenic Hudson sponsored testimony of witness Westfall, which provided revised gas turbine alternatives plus associated costs. Although Scenic Hudson did not withdraw the testimony of exhibits of Lurkis, its initial gas turbine expert witness, the latest proposals by Westfall differ substantially from those advanced by Lurkis. The total estimated capital cost resulting from the latest revision is $12,100,000 per gas turbine unit.

100. Con Ed's estimates are based on a turnkey proposal whereas Scenic Hudson based its estimates on costs estimated by Public Service which would, for pending installations at its Hudson and Mercer substations, perform its

own engineering and design and assume all responsibility for design, installation, and performance of the units.

101. Staff presented evidence on a 2000 mw gas turbine alternative composed of twelve Sewaren-type units, each capable of producing 167 mw. Staff's witness Jessel estimated a unit capital cost of $13,894,000 for a 167 mw dual fuel (kerosene and natural gas) unit. This includes $200,000 for the cost of a main transformer.

102. Consideration of the issue of sound emitted by gas turbines was centered about the costs of sound attenuation as an element of the total capital costs of gas turbines. The record indicates that technology is available to meet very stringent sound attenuation requirements, but the greater the attenuation, the higher the cost.

103. The New York City prescribes maximum allowable noise levels in specific districts (zones). All parties were generally in agreement that additional sound attenuation for the gas turbine units will be required at all turbine sites proposed in New York City. In addition, there was agreement on the total cost of attenuating the gas turbine noise to specified levels. However, Scenic Hudson took the position that Con Ed had provided for more attenuation in its specifications than was necessary for code compliance and that it had incorrectly applied code requirements at certain sites. Con Ed provided for identical sound attenuation equipment for all units at all sites at a cost of $400,000 per unit above Pratt & Whitney's base treatment which in certain instances resulted in more attenuation than required for code compliance at this time.

104. While admitting that it might have included more soundproofing than that required to meet the code, Con Ed's position is that residential development in areas adjacent to proposed gas turbine sites by 1972 would require the additional soundproofing; also, consideration for health of employees working at the gas turbine sites necessitated sound attenuation equipment over the code requirement which is measured at the property line rather than at the unit itself.

105. The record contains extensive evidence relating to fuels suitable for gas turbine operations. The primary fuels used by all parties in developing the economic comparison of the gas turbine alternatives were natural gas and kerosene. The essential consideration involved the reliability of the fuel supply and the economic impact on the particular alternative. Based upon the testimony of its witnesses, Staff concluded that the most dependable-economical method of providing gas turbine fuel was to utilize a combination of off-peak natural gas and kerosene. In its study of gas turbine alternatives, Con Ed used either all kerosene fuel, a combination of gas provided with a liquefied natural gas (LNG) plant and kerosene, or a combination of off-peak gas and kerosene.

106. Scenic Hudson's initial presentation of a gas turbine alternative utilized an all natural gas fuel supply. Subsequently, Scenic Hudson proposed using kerosene fuel only, and then modified this to include dual fueling, thus essentially adopting Staff's fueling method of a kerosene-natural gas combination.

107. Economic evidence introduced during the course of the supplemental hearings established that there has been

an increase in the capital and generating costs since 1967 when the foregoing figures were introduced. The later cost trends show that the increase in hydroelectric capital costs has been less than for any other alternative.[13] The effect of such cost trends on the economic studies in the earlier record is to increase the magnitude of the annual savings attributable to the Cornwall project.

108. Based on the economic evidence, as supplemented, we find that the capital cost of an all gas turbine alternative would exceed Cornwall by not less than $38,000,000. Moreover, operating and fixed costs over a period of twenty years between 1972-1991 utilizing even the most economical fuel would be at least $119 million more than Cornwall.[14] Whatever the claimed advantages of a gas turbine alternative over Cornwall might be—and we have found there are none—all of such claimed advantages cannot outweigh the very substantial detriment to the public interest in terms of excess cost alone when compared to the Storm King project.

109. As we have previously discussed in some detail gas turbines are less reliable for emergency purposes than hydro generation. Because its capital and operating costs are much higher and its reliability capabilities are much less, we find that an all gas turbine facility is not a feasible alternative to Cornwall.

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[13] The greatest increase in costs has been in nuclear electric generating capacity, followed by steam-electric generating capacity, and then by gas turbine generating capacity.

[14] These costs are exclusive of additional fuel costs if gas turbine units are to be maintained as spinning reserve. Such fuel costs could add approximately $5 million annually. If gas turbine units are to be properly evaluated as reasonable alternatives to Cornwall their utilization as spinning reserve (with accompanying cost) must necessarily be considered.

Nuclear-Gas Turbine Combination

110. Another considered alternative to the Cornwall project was a combination of nuclear and gas turbine capacity. Various combinations were considered in the record.

111. Con Ed's position is that any combination of a 1000 mw nuclear unit and gas turbines must include eight gas turbine units. Scenic Hudson proposes a combination including five gas turbine units. The Staff study included six somewhat larger units. The Examiner found seven turbine units would be adequate when coupled with a 1000 mw nuclear unit as a comparable alternative to Cornwall and the initial decision conclusions are based on such alternative. The Examiner found a cost differential in favor of Cornwall of $54,674,000 over a period of 20 years. The Examiner, by utilizing Scenic Hudson's five unit alternative and making adjustments for a seven unit alternative, failed to make an adjustment for added transmission costs associated with each unit. The added transmission cost for two extra units the Examiner deemed necessary amounts to $2,800,000 over a 20 year period. Further, the Examiner in going to seven units adopted Scenic Hudson's figure of $3,299,000 for fixed operating and maintenance expenses for a five unit combination for 20 years. A seven unit combination would increase that cost by $1,320,000.

112. We find that the Examiner's seven gas turbine unit is the minimum which, when combined with 1000 mw of nuclear capacity, can be reasonable compared with Cornwall. Feasible alternatives need not necessarily be exactly

equal in all respects to Cornwall, as Con Ed contends. But the Examiner's cost differential must be adjusted for extra transmission and operating and maintenance costs for seven units. Furthermore, the Examiner did not take into account the factor of extra costs of spinning the gas turbine units. This cost alone would add approximately $5 million annually to the differential. As thus adjusted, we find that a reasonable comparable combination nuclear-gas turbine alternative would cost approximately $158,794,000 more than Cornwall over a 20-year period.

113. We do not accept the proposition put forth by Scenic Hudson that this extra cost is *de minimis* when spread among all of Con Ed's customers. There are often good reasons why it is in the public interest to utilize a more expensive alternative. In appropriate cases the extra cost may even be substantial. But whether substantial or not, the extra cost must be justified by a showing that the alternative is in the public interest. There has been no showing that a combination nuclear-gas turbine alternative offers any advantages or indeed is even reasonably equivalent to Cornwall. In this regard we stress that the reliability quotient of a nuclear-gas turbine combination is far less than Cornwall's. That the extra cost is slight in terms of monthly charges per customer is in and of itself no showing that it is in the public interest to so charge.

All-Nuclear Alternative

114. Testimony was introduced regarding a number of possible nuclear plant sites for purposes of comparisons of an all nuclear alternative and of a combined nuclear-gas turbine alternative with the Cornwall Project.

115. Nuclear units require considerable acreage of open land and an abundant supply of cooling water, limiting possible sites to relatively undeveloped areas adjacent to major rivers or tidal waters. Sites available along the Hudson are limited by the terrain, by present use of industrial parcels along the river, and by the desirability of obtaining at least twenty-five acres for a nuclear plant site. The record indicates that a site about one mile south of Beacon on the east bank of the river (river mile 59) appears most appropriate, since it is unlikely that in the near future it will be possible to construct a large nuclear generating plant within New York City.

116. Nuclear units, like conventional steam units, can respond rapidly in an emergency with a very small percentage of unutilized capacity, assuming the unit is actually in part-load operation, but such instantaneous response cannot be maintained, and the secondary response takes several minutes.

117. Con Ed estimates that the capital cost of two 1000 megawatt nuclear generating units, providing an approximate capacity equivalent to the Cornwall project, exclusive of transmission, is $285,900,000, which compares with Staff's capital cost estimate of $298,000,000. Including transmission facilities via an overhead transmission line in Putnam and Westchester Counties to Sprain Brook, the Con Ed estimate is $341,500,000.

118. The fuel cost of such a unit, consisting of both a fixed cost and a variable cost component, may be expected to vary from 1.82 mills per kilowatt hour in 1972 down to 1.60 mills per kilowatt hour in 1977 and following.

119. If the growth of system load projected by Con Ed is realized, Con Ed contends that combined operating and fixed costs of the system with an all nuclear alternative to the Cornwall project would cost in excess of $192,000,000 more than for the system with the Cornwall project for the years 1972-1991 inclusive, with the annual cost differential growing in the later years. If the exponential growth of load assumed by Staff occurs, the magnitude of this differential would be considerably greater for the same period.

120. Although in support of a combination nuclear-gas turbine unit as its primary and preferable alternative to Cornwall, Scenic Hudson's witness adopted Con Ed's nuclear cost estimates, its witness in support of an all nuclear alternative did not adopt such cost estimates. Instead, his estimates were primarily based on bids to TVA in 1966.

121. In its Brief on Exceptions, Scenic Hudson, while paying lip service to an all nuclear alternative, does not attempt to support its witness's nuclear alternative estimates. Because of the adverse economics of an all nuclear alternative, as well as the reliability and outage problems inherent in such units, there is now no serious support for such alternative. For these reasons, we find that an all nuclear unit is not a feasible alternative to Cornwall.

Alternative Conventional or Pumped-Storage Hydroelectric Sites

122. Both Con Ed and Staff conducted extensive surveys for conventional hydroelectric or pumped storage sites within a radius of approximately 100 miles from New York City. All of their witnesses concluded that there are no suitably located alternative conventional

hydroelectric or pumped storage sites available. All of the potential sites were deemed to be not as economic, or economic only for local needs but not, when combined with extensive transmission costs, for New York City.

123. None of the intervenors presented any evidence on alternative hydroelectric sites.

124. The record is uncontradicted, and we find, that there is no feasible hydroelectric alternative to Cornwall.

Availability of Purchased Power as Alternative to Cornwall

125. The parties also considered the practicality and cost of purchasing firm power from generating sources on other utility systems as an alternative to construction of the Cornwall project.

126. The electric systems which could have available some excess power for sale to Con Ed are the New England Power Pool, the Pennsylvania-New Jersey-Maryland Pool (P-J-M) and the Upstate New York System.

127. The Upstate New York System and the Southeastern New York Companies (SENY) constitute the New York Power Pool.

128. Staff witness Jessel analysed the projected loads and power supplies of utility systems within practicable transmission distance of applicant's system, and concluded that there would not be sufficient excess firm power available for use as an alternative to the Cornwall project.

129. Although the diversity between peak loads suggests that as much as 1130 mw could be exchanged seasonally by the systems in SENY and those in Upstate New York, the requirements for maintenance of generating capacity are such that only about 500 mw could be exchanged between these two groups in 1975.

130. Another opportunity is the purchase of summer power from New England and winter power from the P-J-M Power Pool.

131. The record indicates that the maximum amount of purchases that could be made in a useful manner would be 1080 mw in summer from New England and the same amount from P-J-M in the winter in order to have a balanced, year-around, power supply. But allowing for maintenance of generating equipment, only about 43 per cent of the seasonal diversity would be available for sale to the New York Power Pool Systems. This means that if it obtained all of the energy sold to the New York Power Pool at best Con Ed would receive 465 mw on a two-way purchase basis from the New England Power Pool and the P-J-M Power Pool.

132. To accomplish such purchases would require the construction of additional transmission facilities from the Con Ed System to the New England Power Pool and also from Con Ed to P-J-M. This would require twice as much transmission capacity as would be necessary if purchases were made from only one power pool, even if they are actually available in the amount indicated.

133. Our Bureau of Power's review of Con Ed's power supply problems and ten-year expansion plans, issued in

December 1969, points out that power purchases are often specifically or tacitly conditioned on availability. Generally, these arrangements give the delivering system the option of reducing the amount of delivery, after due notice, if that system finds itself in short supply. Thus there is no real assurance that the power will actually be available when needed.

134. Another considered alternative to the Cornwall development is the possibility of purchased power from Canada, namely from Churchill (Hamilton) Falls project, now under construction. To be a proper source of power supply, the energy from Canada would have to be taken substantially 24 hours per day; otherwise this would not be an economic source. The transmission distance involved and the relatively high cost of transmission facilities makes Churchill Falls power comparable to base load nuclear power or base load mine-mouth power or other sources of base load power outside of New York City, rather than an alternative to the Cornwall development. There is no indication when, if ever, Churchill Falls Power might be available to electric systems outside of Canada. In addition, there is no assurance that it would be available upon system separation.

135. The Northfield Mountain Pumped Storage Project may help answer some of the problems of reliable economic supply in western New England but it is not a reasonable alternate to the construction of Cornwall to serve Con Ed's requirements. That is so because it would require additional transmission capacity in Massachusetts, and the need to enlarge the upper reservoir at Northfield Mountain whether a long or short term sale were contemplated.

Even an enlarged reservoir would provide the equivalent of only 8½ hours of dependable capacity at 500 megawatts, which is less adequate for applicant's relatively flat daily peak than Cornwall, which will provide the equivalent of approximately 11.3 hours of operation at 2000 megawatts. The spinning reserve function of Cornwall would not be served by a purchase of power from Northfield either in quantity of reserve (Cornwall provides 750 mw) or in ready availability. There is also a risk that Northfield might separate from Con Ed.

136. The foregoing indicates that Con Ed would not have available from its neighbors 2000 mw of purchased capacity on a reliable and economic basis. Although about 465 mw additional might be obtained by making summer seasonal purchases from New England and winter seasonal purchases from P-J-M, this power supply would be much less reliable and much more expensive because of required duplicate investment in transmission facilities. The power from New England and from P-J-M would have to come over substantial transmission distances, and in the event of separation loss of such supply would aggravate the stability problem in an isolated SENY network. Finally, if load growth exceeds plant expansion, present sellers may themselves become seekers of purchasable power.

137. The entire capacity potentially available through purchases would be slightly in excess of 1000 mw, substantially less than the amount that Cornwall would provide. Scenic Hudson does not contend that an all purchases power alternative to Cornwall would be feasible, but argues on brief that an alternative consisting of 810 mw of pur-

chased power should be considered. In view of the assumption inherent in this suggestion by Scenic Hudson that the gas turbines would not operate as a spinning reserve, the spinning reserve would have to come from the purchase sources if this alternative is to be comparable to Cornwall. Accordingly this possibility cannot be deemed reliable, since such purchases would not be available in the event of a separation, the very time they would be most needed.

Other Alternatives

138. In addition to the foregoing, a number of other methods of generation that might provide a feasible alternative to Cornwall were considered, including minemouth generation and conventional thermal units, as well as fuel cells and other exotic methods of generation.

139. Minemouth generation, as previously mentioned, is not suitable to provide load protection or spinning reserve. In the case of Con Ed it would require long transmission lines from Pennsylvania or West Virginia vulnerable to separation, and necessitating extensive undergrounding as they approached or crossed urban areas west of the city. The air pollution inherent in minemouth operations while created in a more rural area is nevertheless a negative environmental factor when compared with pumped storage generation at Cornwall.

140. For various reasons, including poor spinning reserve responses and load protection, air pollution, and inability to meet power requirements, we find that none of the other methods are feasible alternatives. None of them are seriously advocated by any of the intervenors, and no

useful purpose would appear to be served by setting out in detail the deficiencies of these alternatives which the record developed.

Aesthetic and Recreational Resources of the Region

141. Finding as we do that the record in this proceeding clearly establishes that the project offers more reliable, cleaner, and cheaper electricity than any other feasible alternative, we now consider whether, and if so to what degree, the project will create detrimental aesthetic and environmental conditions.

142. Pursuant to the Court of Appeals' direction that the Commission carefully consider "the preservation of natural beauty and of national historic shrines", extensive evidence was presented bearing upon the effect of Cornwall on the aesthetic and recreational resources and on the historic significance of the Hudson River Valley and the Hudson Highlands. Part of that testimony constitutes a manual, as it were, for counsel and courts on how to try the issue of environmental effects of works or facilities which require a license or permit from a public agency charged to consider environmental factors in making its decision to grant or withhold.

143. The environmental testimony began with a strong witness, appropriately qualified. Mr. Charles H. Callison, the executive vice-president of the Audubon Society, was experienced, well-travelled, and a leading conservationist. He was furnished the Court of Appeals Opinion, and directed to the key language in it. In clear and straightforward language, he defined the court's term "natural

beauty" as he understood it, and furnished a methodology which he believed could be used to appraise natural beauty. This was followed by word-pictures painted by a master, then by reference to photographs, and finally by a series of comparisons. One section illustrates how any reader might be persuaded to identify with the witness's evocative descriptions:

> "Moreover none of the other rivers has the history, the drama of the Hudson. None has been as much the very waterway of history, the gateway to the north and west, the 'northwest passage' to an empire, if not to the Orient as Henry Hudson thought it might be. In short, the Highlands and Storm King Mountain are unique topographical and scenic features, not only in the East, but in the entire country. In the far West, there are rivers that run through deeper gorges, the Colorado, the Snake, the Yellowstone, the Salmon, and the Columbia, to name a few. But none of them, except perhaps the Columbia, is so great a river of history, of commerce, and of empire, connecting great mountains and wilderness with a great city and seaport at its mouth." (33/4789)

144. There followed, in the prepared case, testimony from a veritable "Who's Who" of conservation, each witness discussing a different facet of this esoteric and subjective matter. The president and general counsel of the National Parks Association, Anthony Wayne Smith, contributed expert legal testimony on the law applicable to this case, including the meaning of the Second Circuit's opinion. The executive director of the Sierra Club, David Brower, related the Storm King "controversy" to other historic confrontations between those who would develop

and those who would preserve, decrying eloquently the preoccupation with "commodity purposes". In his opinion, the project would "serve commodity purposes exclusively," although to be fair it must be recognized that he based this opinion on statements of one of the applicant's witnesses.

145. A planner and landscape architect with impeccable credentials, Charles W. Eliot, 2d, brought his expertise to bear upon the question of whether protective measures would suffice to eliminate the damage. A Yale Professor, Vincent J. Scully, Jr., a teacher of architecture and art history, evaluated the aesthetic importance of the area in terms of his particular discipline:

> "... it is a mountain which should be left alone. It rises like a brown bear out of the river, a dome of living granite, swelling with animal power. It is not picturesque in the softer sense of the word, but awesome, a primitive embodiment of the energies of the earth. It makes the character of wild nature physically visible in monumental form. As such it strongly reminds me of some of the natural formations which mark sacred sites in Greece and signal the presence of the Gods; it recalls Lerna in Argolis, for example, where Herakles fought the Hydra, and various sites of Artemis and Aphrodite where the mother of the beasts rises savagely out of the water. While Breakneck Ridge across the river resembles the winged hill of tilted strata that looms into the Gulf of Corinth near Calydon." (33/4888)

Professor Scully was particularly disdainful of the company's recreation proposal, as tending toward the "suburbanization of the mountain".

146. Later in the proceedings, the renowned Brooks Atkinson brought his reputation as a writer on conservation subjects to bear on the topic. With decidedly spiritual overtones, he opposed the Site 2 alternate, and he discussed what the term "comprehensive plan" means to a professional planner.

147. The words of such eloquent witnesses, of course, quite overshadow the pedestrian prose of examiners and commissioners. Still, as counsel for the Sierra Club in brief succinctly stated the matter, "[t]heir point was not an occult one. Their expertise lay in expressing it, not in feeling it." (Sierra Club Brief on Exceptions, p. 24, Oct. 10, 1968) We therefore are impelled to say that our conclusion that the license must issue does not rest upon any discounting of the case made by the intervenors relating to the natural beauty, historical significance, and spiritual qualities of the Storm King Mountain in its setting.

148. Just as the mountain has swallowed the scar of the highway, the intrusive railroad structure and fills, and tolerates both the barges and scows which pass by it and the thoughtless humans who visit it without seeing it, so it will swallow the structures which will serve the needs of people for electric power. Indeed, most of the structures will literally be buried, and those that cannot be buried, while to be regretted, nevertheless will be made as unobtrusive as ingenuity can make them.

149. The balancing and weighing of conflicting values is our task. It is not a preoccupation with more and more electric power which moves us. It is not a preoccupation with cheap power which moves us. It is not sympathy for

New Yorkers nor lack of it for the Hudson Highlanders which moves us.

150. Yet we cannot avoid these charges.

151. As a commission we know that utilities have a duty to plan for anticipated load growth, that there are limits of reasonableness to the amounts which can be added to the ratepayers' burdens, that noise pollution, thermal pollution, and air pollution are detriments of great significance which will attend the construction of alternate facilities.

152. It is significant that the alternative of a nuclear plant as one potentially less environmentally damaging had much less support in oral argument and later-filed briefs than it had in briefs filed before the concern about thermal and other pollution at such plants had become widespread. Appropriately managed, pumped storage projects minimize pollution of various kinds, producing none at the site, and permit an efficient use of otherwise excess system capacity in off-peak hours.

153. The evidence establishes, and we so find, that the project, as modified and as licensed, constitutes no real impairment of the environmental and scenic aspects of the Highlands and the natural beauty of the area will not be significantly degraded.

154. Although "the Storm King project is to be located in an area of unique beauty and major historical significance" [15] at the same time it is also true that commercial,

[15] 354 F.2d 608 at 613.

industrial, educational, and residential developments line its shores.

155. Even those areas which are presently undeveloped, principally lands owned by the Palisades Park Commission on the west bank of the River, are traversed by a right-of-way for the Penn-Central Railroad and by State Highway 218 (Storm King Highway). There is another right-of-way for the Penn-Central on the east bank. In addition, structures at or near the river include oil storage tanks, piers and docking facilities, the Bear Mountain Bridge, sewage disposal facilities, numerous private houses, and institutions.

156. Originally the project plans called for a powerhouse which would be 80 percent underground, but the design now calls for a powerhouse completely underground. The underground powerhouse would not, in fact, be underneath Storm King. As the contours show, it is located in the village of Cornwall on a small river-bottom foothill.[16] It is visually a part of Storm King Mountain, and about a mile upstream from the entrance to the gorge it merges, in perspective, with the mountain looming behind it. The east face of the mountain is a precipice plunging steeply down to the water's edge.

157. Con Ed proposes to provide certain recreational facilities at the project site as follows:

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[16] The elevation of Storm King Highway in the vicinity of the powerhouse site varies between approximately 280 feet and 200 feet. The proposed external structures are all at elevations below the highway. Above the highway the north face of Storm King rises sharply to an elevation of 1343 feet. However, the east face of Storm King out of sight of the project rises even more steeply from the river's edge.

(A) *Information Center and Recreation Area*

158. This facility, located in the vicinity of the power station, would be operated by the company. It would consist of a visitor's information center, picnic sites, picnic shelter, and parking facilities. The site, including the power station, is approximately 60 acres.

159. The visitors information center, as projected, was to have consisted of a reception room, display areas, a seminar room, and a small auditorium linked by elevator with a lower observation room in the power plant.

(B) *Riverfront Park*

160. It is proposed that spoil composed of rock excavated during the construction of the project will be placed in the river to the west and north of the project adjacent to the present shoreline to form a foundation for a 57 acre, mile-long riverfront park, which will be transferred to the Village of Cornwall upon completion of the project. Two bridges, one pedestrian and one vehicular, are proposed to link this area with the village. It would consist of a number of play areas, individual picnic sites, and two picnic shelters, with sanitary facilities.

(C) *Scenic Overlook*

161. A 36 acre area with a scenic overlook, abutting State Highway 9-W, would be constructed and operated by Con Ed. Individual picnic sites and a center picnic shelter are to be included. Relocation and construction of trails in this area would be accomplished upon completion of the project.

162. In order to construct the scenic overlook about 140 acres will be acquired from private owners. Since the area for the overlook is estimated to occupy only about thirty-six acres Con Ed proposes to transfer any land not developed in connection with the overlook to the Palisades Interstate Park Commission for recreational use.

163. At present, the only significant area devoted to recreation within the Highlands is the Palisades Interstate Park system, which includes Bear Mountain and Harriman State Parks. An additional tract of land, known as Storm King State Park, immediately to the east of the Project is also owned by the Palisades Interstate Park Commission. Because this land is separated from the Park system properly, it has never been developed for active recreation purposes. There is some discussion in the record about the possibility that the Palisades Interstate Park Commission will eventually develop the tract. However, the Park Commission has no present plans to that effect.

164. On the east bank the newly created Hudson Highlands State Park, administered by the Taconic State Park Commission, has acquired approximately 2,500 acres and Professor Eliot, for Scenic Hudson, asserted that the project will be incongruous with proposed recreational developments within this park. Proposed Hudson Highlands State Park recreational developments affecting scenic views, as described by witness Dyer, for the Taconic State Park Commission, include the following: (a) picnic area facilities on relatively flat portions of Little Stony Point, plus a small trail to the top of the bluff; (b) a parking area, approximately 2,000 feet long, directly opposite the east face of Storm King Mountain; (c) overlook facilities oppo-

site Pollepel Island north of Storm King Mountain and the entrance to the Hudson River gorge.

165. Towns bordering on the river in the Highlands have not preserved land adjacent to it in any "natural" state. In the town of Philipstown, on the east shore, the area adjoining the river, part of which is now incorporated in the new Hudson Highlands State Park, is zoned to include both industrial and residential uses; in the Town of Cortlandt, property adjoining the river is zoned for light manufacturing and commercial uses. On the west shore of the river, the Village of Cornwall has zoned the property adjoining the shorefront railroad tracks for light manufacturing; the bulk of the plant site is zoned for residential-agricultural use. Neither the Town of Highlands nor the Village of Highland Falls on the west shore have any zoning ordinances.

166. There has never been any public access to the power station area since it has been consistently in private hands.

167. Most of the land is zoned for residential-agricultural use. The land adjoining the shorefront railroad tracks is zoned for light manufacturing.

168. The area abutting the river immediately to the west of Site 1 was once the site of quite extensive commercial and industrial development. Its present condition is one of almost complete decay. The railroad tracks and embankment running parallel to the river along the riverfront prevent ready access to the river. Some of this blight is covered in summer by foliage and not visible from the river.

169. The 1966 report of the New York Hudson River Valley Commission, made a part of the record, states that

it is regrettable but nevertheless the fact that many areas along the riverfront have fallen into sad states of neglect and decay, largely because of the decline of the importance of the river as a transportation artery.

170. There are no present plans by any state or public agency to develop either the area above the proposed powerhouse or the Cornwall waterfront.

171. Setting forth the situation as it now exists with respect to the region abutting and adjacent to the river is neither to condone nor to accept the detrimental environmental and aesthetic aspects which have impinged on the Highlands. It should not be inferred that there is any finding by this Commission that previous and existing environmental detriment permits additional detriment which would otherwise not be permitted but for existing conditions.

Improvement and Development of the Waterway

172. The Federal Power Act provides in part as follows:

"Section 10. All licenses issued under this Part shall be on the following conditions:

(a) That the project adopted, including the maps, plans, and specifications, shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, and for other beneficial public uses, including recreational purposes; and if necessary in order to secure such plan the

Commission shall have authority to require the modification of any project and of the plans and specifications of the project works before approval."

There are, at present, no reservoir or power projects in the Hudson River basin authorized for Federal construction, although there are special projects authorized for navigation, beach and shore erosion control, flood control, etc.

173. The Commission has been informed by the Chief of Engineers that the Cornwall project is satisfactory as far as the interests of navigation are concerned. It was recommended that certain provisions in the interest of navigation, included in Form L-4, be inserted in the license should one be issued.

174. In considering whether the project is the one best adapted to a comprehensive plan for improving or developing a waterway for the use or benefit of interstate commerce, for the improvement and utilization of waterpower development, and for other beneficial public uses, including recreational purposes, the Commission necessarily looks to and considers future benefits rather than past detriments, but in looking to future benefits the Commission considers past detriments and thus assesses whether the proposed project will improve present and existing conditions.

175. The utilization of the Hudson River for electric generation by the proposed project is well adapted to development of the waterway for the use or benefit of interstate or foreign commerce.

176. No party to this proceeding has suggested any other plan or project for improving or developing the waterway itself for the benefit or use of interstate commerce. No one contends that the proposed project will contribute any thermal, chemical, or solid pollutants to the waterway. It cannot therefore be held to interfere in any way with any program which may now or in the future be planned for the river.

177. In determining whether the project is best adapted to a comprehensive plan for improving or developing the waterway the evidence is that it will not interfere with navigation or river traffic, will not contribute to any form of river pollution, will not interfere with fishery resources and will by the generation of electric power develop the waterway for the benefit of interstate and foreign commerce.[17]

178. Though not even suggested by any party, no hypothetical project would appear to be able to improve or develop the waterway without interfering with navigation or river traffic and neither interfering with fishery resources nor contributing to waterway pollution while at the same time benefiting interstate and foreign commerce.

179. Turning our attention to that clause of Section 10 (a) of the Act regarding "improvement and utilization of waterpower development," no utilization for the waterpower of the river other than for generation of electric

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[17] The New York Water Resources Commission is the State agency responsible for setting policy and coordinating programs with regard to New York's water resources and "the Commission is not opposed to the development of the project now proposed by Consolidated Edison." (Tr. 1/79).

power by this project has even been suggested by any party. In that sense there is no basis or reason to believe that this project is not best adapted for the improvement and utilization of waterpower development of the Hudson River. Any finding that some other project is better adapted to the improvement and utilization of water power development of the Hudson River would have to be reached out of thin air without any evidentiary support.

180. Section 10(a) also requires that the project be best adapted "for other beneficial public uses, including recreational purposes;"

181. The Examiner found that:

> "The evidence is conclusive that the visitors' center and the picnic area would leave Storm King untouched, would constitute no real impairment of the mountain's scenic aspects and to a significant degree, would improve and upgrade the area by a restoration to a natural condition which would be compromised only by the addition of such facilities as would be appropriate for the enjoyment by the public of the scenic values which the situation provides."
>
> (Initial Decision, p. 70, August 6, 1968).

182. Regarding the scenic overlook with picnic areas and shelter facilities he found that it "would not significantly impair the scenic area, would not represent an encroachment upon Storm King . . . nor be an encroachment of substance upon a wilderness area." (p. 73). He further found that "the overlook would provide recreational opportunities where none have existed heretofore, of a nature particularly suited to the convenience and necessities of a tour-

ing public. All of these facilities are desirable as recreational assets, . . . " (p. 75).

183. Scenic Hudson alleges that the most significant event since the close of the 1967 hearings was the establishment by the State of New York of the Hudson Highlands State Park directly across the Hudson from Storm King Mountain. Both Scenic Hudson and the Sierra Club argue that the screened visitors' center proposed at the Cornwall site would not be compatible with the proposed park development on the east side of the Hudson.

184. The evidence is, however, that recent developments of the Palisades Interstate Park and the Hudson Highlands State Park within the Hudson River Gorge follow the pattern of a recreational, as distinguished from a natural or wilderness area. These developments are primarily devoted to such recreation as motoring, picknicking, swimming, camping, hiking, boating, skiing, horseback riding, and fishing.[18]

185. Near the southern end of the gorge the Palisades Interstate Park is reconstructing Fort Montgomery. There will be an access road, a parking lot, and a visitors' center. According to its 1968 report the Palisades Interstate Park is planning "roadways, parking areas, utilities and a marina" at Iona Island, within the gorge.

186. As previously mentioned, proposals for the Hudson Highlands Park include a parking area opposite the east

[18] Commissioner Wirth testified that within the Palisades Interstate Park there was an inn, a swimming pool, skating rink and ski area, for all of which a charge was made. Parking facilities were also provided. (Tr. 120/18,010-18,011).

face of Storm King Mountain, picnic area facilities at Little Stony Point, and overlook facilities opposite Pollepel Island. The opposition by Scenic Hudson and the Sierra Club to construction of similar facilities in connection with the project is not carried over to construction or existence of comparable facilities in Palisades Interstate Park, Hudson Highlands State Park, or Taconic State Park.

187. As proposed by Con Ed, the powerhouse site, including the visitors center, picnic area, parking areas and access roads, would occupy approximately 60 acres. Of these only about 3 or 4 acres would be utilized for the portal entrance and tailrace.

188. Although the visitors center and picnic areas at the powerhouse site have much to recommend them and would not constitute a real impairment of the mountain's scenic aspects, we conclude that the proposed riverfront park and the scenic overlook, in view of the many other recreational areas which now exist in the Palisades State Park or will be built in the Hudson Highlands State Park, will provide sufficient recreational facilities and such beneficial public uses as to amply meet the standards and requirements of Section 10(a) of the Federal Power Act without the need for additional recreational and visitor facilities at the powerhouse site. Limiting the external features at the powerhouse site to the portal entrance tailrace, and access road, totalling approximately 3 or 4—acres out of Storm King's total of over 400 acres—should reduce to a minimum the visual impact on the scenic vistas of Storm King Mountain or the Highland Gorge of the Hudson River and thereby preclude any material scenic impairment or detriment.

189. The power station and the transmission circuits leading from it to Cornwall East will be underground or

under water. It is proposed that the land surface above the power station will be replanted and as much of the existing growth as possible preserved. The only permanent above-ground structures on the site will be the portal entrance to the underground chambers, an access road and the tailrace.

190. The tailrace would be located where the river widens above the gorge and curves west by north, above the powerhouse. From the bank directly across the river the distance is 4000 feet. Because of the curved shoreline at that distance, at the river level there would be no direct view of the tailrace.

191. The project tailrace and abutments on either end will be 685 feet long, with the horizontal cut back from the existing shoreline varying from 195 to 260 feet. The height of the railroad crossing at the tailrace would remain the same as at present. The maximum elevation of the vertical rock cut will be thirty-two feet above river level, but because maintenance of the presently existing railroad requires a bridge extending twelve feet above river level, the maximum height of the vertical cut visible to anyone on the river will be only twenty feet at the east end of the tailrace. No rock cut at all will be visible above the railroad bridge at the west end of the tailrace. The planting of vines on the rock face behind the tailrace should further serve to ameliorate the view from the river.

National Historic Shrines

192. In compliance with the Court of Appeals ruling that the Commission's renewed proceedings must include a concern for the preservation of national historic shrines, substantial testimony was proffered on this issue.

193. There is no dispute that the project is to be located in an area of major historical significance. The importance of the Highlands in history—military, political, and cultural—has been dictated by geographical and topographical features.

194. During the Revolutionary War the Highlands were strategically vital because the Hudson was the only river on the eastern seaboard that was navigable north of the Appalachian Range.

195. Historic personages linked to the area are Lafayette, Knox, Putnam, Hamilton, Andre and Benedict Arnold. Within a 15-mile radius of the project site are located Washington's headquarters at Hasbrouck House, Forts Montgomery and Clinton, Knox's headquarters, the New Windsor Cantonment, the United States Military Academy, and Stony Point Battlefield, all important historic landmarks. However, as the Sierra Club stated "It is not claimed that from the peak of Storm King Mountain was launched a major war, or that at its base was fought a noteworthy duel . . . ."

196. There are Revolutionary War sites from Staten Island, in New York Bay, to Lake Champlain and beyond.

197. The NENYIAC Report[19] states that the best preserved Revolutionary fortification in the Highlands are on Constitution Island. It continues:

> The ultimate transfer of Constitution Island to the National Park Service for development as a historic

[19] Report on the Land and Water Resources of the New England-New York Region, Sen. Doc. No. 14, 85th Cong. 1st. Sess. (1957), a part of the record.

site deserves serious study. The National Park Service now administers the Saratoga National Park, commemorating the defeat of Burgoyne in 1777, but there is no area under any jurisdiction where the vital significance of the Hudson Valley throughout the whole war of the Revolution is illustrated adequately. Constitution Island is proposed for study as probably meeting this need. Interpretation here could include reference to Stony Point, Fort Clinton, Fort Montgomery, the Newburgh area, and related sites up and down the Hudson, making them into a colorful and stimulating tour.

198. Constitution Island is located at approximately river mile 53 and the proposed scenic overlook, affording a view toward Constitution Island as well as to the north, is located inland from about river mile 53.75. We believe that views of this historic spot should be available in order to impress upon visitors its strategic location and importance in the infant days of our republic. The Bear Mountain Section of the Palisades Interstate Park is already making known the historic sites of the area. A scenic overlook which enhanced the viewer's appreciation of this historic area is in the public interest. It seems inappropriate to applaud scenic overlooks of historic sites when constructed on park lands by public agencies while deprecating a similar facility situated on private lands, but equally dedicated to the public.

199. The Highlands also gave birth to the Hudson River School of American Art which has been called one of the most important of all schools and chapters in the history of American art.

200. Similarly, a number of important literary figures lived and worked in the Highlands, of which Washington Irving and James Fennimore Cooper are perhaps the best known.

201. In addition, a number of mansions and villas were built along both shores of the Hudson throughout the Highlands, some of which remain and have historical and architectural significance.

202. Despite the fact that the area is one of historical significance, no significant historical event has ever actually taken place in Cornwall or closer than Constitution Island and West Point (river mile 52.5) or Forts Clinton and Montgomery at Bear Mountain (river mile 46.75). In any event, the Cornwall site would not be visible from West Point or Constitution Island though environs Constitution Island would be visible from the scenic overlook. It is apparent, and we find, that the project would not cause the destruction of any historical site.

Advisory Council on Historic Preservation

203. Scenic Hudson objects to any consideration by the Commission of the findings of the Advisory Council on Historic Preservation, adopted on May 8, 1969, that "Plans I, II, and Alternate II presently under consideration by the Federal Power Commission are almost identical in their minimal adverse effect on the scenic values for which the Park was initially established. None of the plans affects adversely the cooperative effort that permits the continuation of the Park as a conservation area."

204. It claims that the statement is not only contrary to the evidence but that it is *ex parte* in that Scenic Hudson

was not permitted to participate in the deliberations of the Advisory Council whereas Staff attended and the Council previously had the benefit of Staff's brief opposing exceptions, dated October 28, 1968.

205. We disagree with Scenic Hudson. We believe that should the Commission fail to obtain, or ignore, the views of the Advisory Council on Historic Preservation, it might be construed as a violation of statutory requirements. See *Historic Preservation Act of 1966* (80 Stat. 915).

206. Contrary to Scenic Hudson's contention, the submission to the Advisory Council of Staff's brief would not appear to be a violation of procedure since the Council does not conduct proceedings within the APA; Staff is not an advocate for the applicant; and the Council's views are, in any event, advisory only and not conclusive on the issue.

207. Scenic Hudson, while complaining of its non-participation, does not actually accuse Staff of participating, merely stating that "Staff Counsel attended" (Scenic Hudson Brief Opposing Exceptions, p. 5, March 3, 1970). Scenic Hudson is, or should be, aware that witness Wirth, whose environmental viewpoint Scenic Hudson has strongly supported in this proceeding, was invited to express his views before the Advisory Council at the May 7, 1969 meeting but did not appear. Further, the Advisory Council is the sole arbiter of the proceedings before it. The Commission is not precluded from considering the views of the Advisory Council merely because Scenic Hudson's views were not presented to the Council. Scenic Hudson has had ample opportunity to present evidence in this proceeding

and make its views known. There is no failure of due process in the premises.

208. The findings of the Advisory Council are not, despite Scenic Hudson's contention, contrary to the evidence, which is that the continuation of the Park as a conservation area is not precluded by the project. We find that the facilities proposed would provide expanded recreational opportunity and use of the project area by the public. Our finding is made on the basis of record evidence, independent of consideration of the findings of the Advisory Council, which simply confirms our conclusion.

209. The overlook unquestionably will enable visitors to enjoy the scenic vistas of the Hudson River. The external aspects of the project, as visible from the river, comprise only a very small proportion of the project as a whole. They do not seriously or substantially impinge on the scenic, historic or environmental qualities of the area. The beauty of the Highlands will not only remain, but the clean-up of the riverfront area and creation of a fine park will contribute substantially to those qualities. It may not be possible to prevent scars during construction, but these are of relatively short duration. The evidence amply demonstrates a desire on the part of the Applicant not only to minimize the man-made impact of the project on the natural scene but to restore it as much as possible.

210. The issue involving the project reservoir and its impact on the scenic, historic, and environmental qualities of the area will be discussed separately, but insofar as it relates to the overall scenic, historic, and environmental issue we incorporate it in our finding that the project will not have a substantial or material adverse effect on the scenic, historic, or environmental qualities of the area.

National Environmental Policy Act of 1969

211. There is a heightening concern with the effects of energy utilization on the environment. The proper use of resources to improve man's standard of living while preserving the quality of man's environment is a major goal. Our ability to meet future requirements while avoiding further deterioration of our natural environment will very much depend on the means we select to meet those requirements.

212. Since the close of the record, the National Environmental Policy Act of 1969 was enacted. 83 Stat. 852 (Pub. L. No. 91-190, approved Jan. 1, 1970). That act recognizes the profound impact which proposed activities may have on all components of the natural environment, and declares that it is the policy of the Federal Government to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic and other requirements of Americans. To that end Section 102(2)(C) of the Act sets forth that Federal actions affecting the quality of the environment shall include a statement on (1) the environmental impact of the proposed action, (2) any adverse environmental effects which cannot be avoided should the proposal be implemented, (3) alternatives to the proposed action, (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (5) any irreversible and irretrievable commitment of resources which would be involved in the proposed action should it be implemented.

213. The Sierra Club points out that Section 102(D) of the Act requires Federal agencies to "study, develop, and

describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The point missed by Sierra Club in its opposition to the project is that there is essentially no conflict concerning alternative uses of available resources because with the exception of the small part of the Black Rock Forest to be flooded by the reservoir practically none of the other parts of the project preclude alternative uses of available resources. The space taken by the scenic overlook does not preclude any alternative use of the vast remaining resources which are available. Nor does the project in any way preclude the development of the Storm King section of the Palisades Interstate Park.

214. It is not a question of "either-or" but rather a situation of compatibility of utilization of available resources. In terms of utilization it would appear that the underground aspects of the project cannot reasonably be said to conflict with any alternative use.[20] In terms of rehabilitation of the waterfront area and construction of a waterfront park, the utilization of available resources weighs overwhelmingly in favor of aesthetic and environmental improvement which the project brings to bear on the available resource. Indeed so far as the waterfront park is concerned, one would be hard put to think of a better example of what is intended by the clause "other beneficial public uses, including recreational purposes." The scenic, aesthetic, and environmental objections raised in this proceeding are largely muted regarding this aspect of the project.

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[20] In this connection it should be noted that the Park Commission does not object to the subterranean utilization of park lands for the power tunnel and penstocks. (Tr. 120/18,049-50; 18,056-57; Park Commission Br. Op. Ex., p. 16, March 4, 1970).

215. Still another approach to weighing "alternatives to the proposed action" from an environmental standpoint is to compare the operational consequence to the environment of the Cornwall project with similar consequences which would result from any reasonable alternative project. We conclude that none of the most likely proposed alternatives, including an all-nuclear unit or the mixed nuclear and gas turbine combination, could be sited within 100 miles of New York City with any less physical impact on the environmental aspects of the affected area than the Cornwall project.

216. Although the proceedings herein were prior to the Act the record amply demonstrates that full and careful consideration was given to all the concerns which the Act embodies.

217. The evidence in this proceeding establishes that the project as now designed is compatible with the natural environment and will have no adverse effect on the ecology of the area. No water pollution or damage to the fishery of the river will be created by the project. No diminution of the water quality in the river will result from the project. Air pollution by reason of the project will be less than would otherwise be possible in meeting the needs for electric energy. New recreational resources will be created by the project. None of the numerous alternatives considered in detail can meet the social, economic and environmental requirements of our society as well as the proposed project. Its potential contribution to reliable electric energy to insure the health, safety, and convenience of millions of people is unique and unequalled by any other alternative. The capability of the proposed project to meet the peaking

energy requirements is not exceeded by any alternative and its capability to do so in a more economic manner is also established by the record in this proceeding. Any short-term adverse impact on the natural environment is more than offset by the enhancement of long-term productivity which will result from the project. The resources which will be committed to this project are the acreage it will necessarily encompass and the fuel resources which will be committed to pumping energy. But the electric energy resources which will be generated by the commitment of such resources will many times over "foster and promote the general welfare" and "fulfill the social, economic and other requirements of present and future generations." Section 101(a).

218. Accordingly, we are licensing this pumped storage project because the record in this proceeding establishes that this is the best use of available resources to meet the requirements for electric energy with the minimum adverse impact on our environment. The record establishes that no alternative can so well meet the requirements with lesser detriment to our environment.

Fishery Resources

219. We were directed by the Court of Appeals on remand to give consideration to the question whether the Cornwall project will have an adverse effect on the fish life of the Hudson River. The Court was concerned with lack of evidence on the major spawning grounds of striped bass and also stated that the record would be more fully developed on the issue whether eggs and larvae subject to influence of the project would be threatened with destruc-

tion and whether any screening device would protect these early stages of fish life.

220. Toward this same end a three year Hudson River fishery study, commencing in 1965, has been conducted. This study, under the field direction of a technical advisor of the U. S. Bureau of Sport Fisheries and sponsored by the New York State Conservation Department and the U. S. Fish and Wildlife Service, was financed by Con Ed. Although earlier portions of the study are part of the record, the complete report was not available at the close of the remanded proceedings. Since then the Hudson River Policy Committee issued the study report entitled: Hudson River Fisheries. Investigations 1965-1968. The Commission takes official notice thereof.

221. The investigation and its evaluation of the project in relation to the fish in the Hudson River is a most comprehensive study of the problem and as definitive a development of the issues raised by the Court as is ever likely to be achieved within the realm of practicality. It concluded that the proposed project would have no significant effect on most fish life, although additional studies should be made after the plant is constructed in order to establish actual effects. The report found that although substantial numbers of striped bass eggs and larvae would be drawn into the plant, less than 0.7 percent of the total number of eggs produced in the river and 2.9 percent of the larvae would be vulnerable to removal. Further, although young striped bass are vulnerable until they reach screenable size, and up to 6.2 percent of these young in the Cornwall area could be withdrawn, this percentage is negligible when related to the total population of this species in the Hudson River. The investigation studies in 1967 of 8 locations ranging from river mile 35 to river mile 123 revealed that the heaviest concentration of

striped bass eggs was at Saugerties (river mile 102.5), with the next heaviest at Hyde Park (river mile 82) and the third heaviest at Cornwall (river mile 56.5). In 1966, however, Saugerties had ranked only fifth whereas Peekskill (river mile 45.5), which tied for fifth in 1967, was first. Cornwall in 1966 ranked fourth. The fluctuations in concentration of striped bass eggs would seem to indicate that the spawning grounds in the river are not only far reaching but also not consistently more favorable in one location than another. To this effect, a 1955 study revealed that the concentration of eggs was highest at river mile 51, with river mile 61 second and river mile 53 third. Yet this study which found the highest concentration in the Cornwall area found practically no eggs in the vicinity of river miles 82, 100 and 44, all of which in the 1966 and 1967 studies ranked first or second in egg concentration.

222. Dr. Perlmutter, a witness for Con Ed, pointed out that the area in the vicinity of Cornwall is only a small part of the Hudson River spawning area for striped bass which covers about 80 miles of the river. His testimony, in this respect, is supported by the results of the Fisheries Investigation. Dr. Raney for Scenic Hudson was of the opinion that the greatest amount of spawning was in that 50 mile area 25 miles above and below Cornwall, and Mr. Dagon for the Hudson River Fishermen's Association was of the opinion that the critical range for spawning of striped bass is no more than a 15 mile stretch of the river with the geographical center somewhere around West Point (river mile 48.25). Yet the 1967 fish studies showed the second highest concentration of eggs at river mile 82, with the highest concentration at river mile 100.

223. The studies and expert testimony on behalf of both proponents and opponents of the project lead to the conclusion that bass spawn substantially in the Hudson River over an 80 mile reach, including the Cornwall area, and that no part thereof is distinguished as a major spawning area.

Fish Protection Devices

224. The fish protective facilities as redesigned and now proposed provide that the tailrace will be crossed by a railroad trestle so situated as to permit mounting of stationary fish screens with 3/8" square openings hung on vertical members which allows escape for small fish. The redesign of the tailrace included increasing the screening surface in order to reduce intake velocity. The protective device is comprised of 48 screens each having two sections 22 feet high and a total length of 560 feet. The 96 screen section can be lifted for cleaning, after prior insertion of a backup section. It is anticipated that these screens will not need to be cleaned more than once a month.

225. Trash racks are mounted on the same removable frame as the screens. The top of the fish screen is located six feet below mean sea level, above which a flat steel plate, acting as an ice barrier, presents a continuous place surface where there will be no inward flow of water during a pumping cycle, thereby making it easier for small fish near the surface to rest or swim away from or along the tailrace. A velocity of slightly over one foot per second appears to be critical in relation to the ability of small fish to swim away from a screen of this nature. The Cornwall average pumping velocity would be slightly less than one foot per second one foot in front of the screens, increasing to 1.68 fps at two or three inches in front when the plant is pumping at maximum capacity.

226. No witness suggests that eggs and larvae and fish under 1½ inches in length could be screened from the plant. The issue was the amount of eggs and larvae which would be drawn in and the effect thereof. There was testimony that the survival rate would approximate 80 per cent. Basically this relates to striped bass because their eggs and those of shad are not adhesive, but the shad spawn far enough upstream so that their eggs and larvae are not affected. The eggs of all other species adhere to whatever they are laid on.

227. The fragility of striped bass eggs is in dispute. Mr. Walburg, a fish biologist for the Department of Interior, testified that eggs in a glass jar had been killed by vibrations caused by striking that jar with a ring. Also, eggs struck by stirring rods of fine material pop. Dr. Raney, for Scenic Hudson, stated that striped bass eggs are fragile in the sense that all fresh eggs are more fragile than a young juvenile or an adult fish, and that eggs are more fragile at some stages than they are at others. The record also reveals, however, that egg samples have been successfully recovered by means of towed nets, have been handled in hatcheries, have survived spawning in rapids and turbulent water, and have survived water pressures similar to those which would be encountered in the project. As fish eggs go, the evidence is that striped bass eggs are not particularly fragile, but are susceptible to damage in many ways.

228. Pressure changes within the plant will range from 30 to 540 psi. In order to determine the effect on fish life drawn into the plant, pressure tests indicated that fish can withstand extreme changes in pressure, and hydraulic

pressures as such are not a major factor in destroying eggs or small fish. Nor does velocity in itself represent a hazard to eggs and larvae passing through the plant.

229. The effects of turbulence were not established. Dr. Perlmutter, for Con Ed, testified that striped bass eggs are frequently laid in turbulent water and therefore have a high resistance to turbulence, whereas testimony by witnesses Walburg and Massman is to their fragility. Similarly, damaging effects of abrasion are disputed. Abrasion would be mitigated by the smooth design of the surfaces of the intakes and tunnels and adhering layer of water. There is not much in the record on abrasion. Dr. Perlmutter testified that an occasional egg might be affected by abrasion. The Examiner concluded, and we concur, that abrasion would not present a significant hazard.

230. Regarding the hazard of impact with turbine blades, experiments relating to the passing of salmon fingerlings and yearlings at dams on the Columbia and Elwha Rivers indicated that the contact with turbine blades was not a mortality factor. At one point, 89 per cent of the fish passing through the plant survived; at the other, 100 per cent survived. Professor Bell, witness for Con Ed, testified that overall hazards of plant operation would result in an 80 per cent rate of survival of fishes of sizes 1.3 inches to 1.5 inches in length.

231. Scenic Hudson's witness Raney contends that anything resulting in destruction of eggs, larvae or young fish might have an important effect upon the number of adults in the fishery. And he asserts that the cumulative effect of

this operation could enhance the risk to a point where there would no longer be a substantial fishery.

232. However, Staff's witness Hauck testified that while the mortality rates of fish, fish eggs, and larvae inhabiting the water which will be drawn through the screen and the plant cannot be measured short of actual measurement during project operation, in his opinion the losses to the fishery caused by the operation of the project would not significantly affect the Hudson River fishery resources.

233. We find that the evidence indicates a reasonably high rate of survival of eggs, larvae, and young fish of the year drawn into the plant.

234. Debris against the screen is also a potential hazard to eggs and larvae in that it creates changes in velocity and pressure. Scenic Hudson contends that not only at maximum pumping will velocities at the screen itself exceed one fps but that blockage of the screens by trash will increase these velocities.

235. Again, the evidence is minimal regarding this hazard. The Examiner agreed "admittedly no practical screen yet devised will screen out either eggs, or larvae, or very small fish." However, since model studies at maximum ebb tide indicated that velocities just in front of the screens are less than one fps the Examiner concluded: "Nevertheless, with a velocity in front of the proposed screens of 0.75 to 0.925 fps,[21] small fish including early juvenile striped bass and shad should be able to

[21] Velocities varying by reason of distance ranging from 1 foot to 2 or 3 inches and pumping rates ranging from 18,000 cfs to 21,600 cfs.

move freely to the quiet areas in front of the ice barrier and piers and even directly away from the screen . . .." In so far as debris is concerned, generating cycles would serve to remove debris by the back washing effect of the discharge. Further, the design calls for the installation of water jets in the fish protection structure to permit the cleaning of slime from the mesh screens. Accordingly, we find that accumulation of debris would not be a major hazard to fish life.

236. Stranding of eggs and larvae in the reservoir is a problem in that they tend to sink so that they may smother or die on the bottom. Also, young fish might evade the withdrawal current and thus remain in the reservoir instead of returning to the river. The Examiner suggested that pumping and generating cycles in the spawning season of May and June could be adjusted to an adequate distribution of egg and larvae and thus minimize or compensate for any descent to the lower levels of the reservoir and entrapment in the pool. In order, however, to overcome possible losses by impoundment in the reservoir or from other aspects of plant operation, Con Ed proposes replacement by means of a hatchery.

Hatchery Operations

237. Testimony on the fishery issue also considered the pros and cons of hatchery operation as a means of replacing any losses caused by operation of the project.

238. Striped bass hatcheries have been operated on the east coast by the Department of the Interior and the States of North Carolina and South Carolina. Successful artificial propagation of striped bass is a problem of

substantial magnitude. The hatchery must be located close to spawning grounds. Procurement of ripe males and gravid females within two to three weeks to natural spawning,[22] holding and conditioning the fish for ovulation, incubating the eggs and the holding of larvae until free swimming may be a process of some three months.

239. Staff witness Stevens, an employee of the Department of Interior's Bureau of Sport Fisheries and Wildlife, and a former director of the Moncks Corner, S. C. hatchery from its inception in 1961 through 1965, is a pioneer in the development of large scale artificial propagation of striped bass. He testified that techniques and procedures developed and utilized at Moncks Corner had been successfully used in 1967 in the Roanoke River, N. C. and on the Staunton River in Virginia. In his opinion, striped bass could be artificially ovulated on the Hudson River.

240. In recent years there has also been a breakthrough in the rearing of striped bass to the fingerling stage, *i.e.*, about the length of a finger. The planting of fingerlings instead of larvae would greatly reduce loss to predators.

241. On the issue whether such fingerlings upon maturity would be able to spawn successfully in the Hudson River, witness Stevens was of the opinion that they would be able to do so.

242. Witness Hauck, Staff fishery biologist, was of the opinion that artificial propagation of striped bass is feasible, and obtaining an adequate stock of adult fish in

[22] The obtaining of an adequate supply of brood fish without damage is apparently the most critical step.

the Hudson as proposed by applicant appears to be possible. He stated that the State of South Carolina is doing a commendable job with their striped bass hatchery and it is his belief that their methods are equally applicable, at reasonable costs, to the Hudson River stocks. Using only adult fish which spawn above Cornwall and returning their eggs and larvae to the river below Cornwall, artificial propagation could be expected to increase the survival rates of eggs and larvae over those rates which would be experienced in the Hudson River under natural conditions. The increased production to the river could offset any losses caused by the project.

243. Scenic Hudson's position on hatcheries is that they are generally not feasible at all; that if feasible elsewhere, they are not feasible in the Hudson; that hatchery fish are sterile; and that costs are prohibitively high. Scenic Hudson contends not only that the difficulty of securing an adequate supply of breeding fish in the necessary quantities at the precise times when they would be ripe for hatching operations but that reliance on hatcheries in saving fish in an estuary has never been tried and would be a forlorn hope. It argues that while no absolute conclusions can be drawn from the evidence, the hazards ought not be incurred in the absence of positive necessity.

244. In this regard it is joined by the Izaak Walton League which asserts that operation of a fish hatchery is a far more difficult matter than is realized by Con Ed in its offer to replace lost fish eggs and larvae, and it expresses doubt about Con Ed being able to make good on its proposal. It also claims that the myriad problems relating to total ecology of the river have not been considered.

245. Witness Raney's fears as to what might or could happen are counterbalanced by testimony based on sampling studies which relating egg producing capacity of the striped bass to volumes of water involved in plant operation indicates that the impact on Hudson fishery would not be substantial. Thus even if none of the fish and eggs at Cornwall survived, the total impact woud be small. The evidence, however, is to the effect that no such disaster would befall the Cornwall segment. Eggs, larvae and fish entering the plant would have a survival rate in the area of 80 per cent. Further, hatchery operations elsewhere indicate the feasibility of an operation in the Hudson which would be capable of replacing any losses attributable to the project.

246. The record shows, and we find, that striped bass hatcheries, while still continuing experimental procedures, have been successful and striped bass fingerlings can be hatched from Hudson River stock and upon reaching maturity should be the equal of river born. The record supports a finding that there is no substantial adverse effect on the fishery. In fact enhancement of the fishery can be accomplished by artificial propagation in the state of the scientific art as it now exists.

247. Assertions by Scenic Hudson, the Nature Conservency, the Citizens' Committee on Natural Resources, and the Hudson River Fishermen's Association that material ecological detriment will result is not supported by evidence which is susceptible of reasonable measurement. The evidence on which Scenic Hudson relies in its exceptions to refute the Examiner's findings that no such detriment will result are the following generalities set

forth by its witness Raney, "anything that is done with a substantial amount of water which would result in the destruction of eggs or larvae or young or juvenile might have an important effect upon the number of adults that were available in the fishery . . . " "Anything that man does is substantially opposed to nature. So if you build any sort of a structure you will have situations which are not found naturally in the environment so here you have an additional situation where you have fishes drawn up into an artificial impoundment, eggs drawn up, larvae drawn up, possibly thirty species upon which they feed. So it is a very complicated business to try to evaluate the overall effect this will have. But basically the effect will be harmful to the fishes."

248. But Raney also testified that he was not prepared to testify to the degree of that effect. "I think that anything that affects any substantial number of eggs, larvae, young or adult, could ultimately have a substantial effect on a fishery. But the degree of the effect I don't know."

249. We are aware that there has been a substantial destruction of fish at Con Ed's nuclear plant at Indian Point (river mile 42.5). The record, however, does not set forth with any particularity the cause thereof. It has been surmised that the fish are attracted to the warmer water discharged close to the conduit, especially in unusually cold weather, and that the intake screens in close proximity to the discharge conduit became clogged because of the large numbers of fish so attracted. As a consequence, they are thought to have suffocated. In any event there is no evidence or reason to believe that the causes of the fish damage at the nuclear plant at Indian Point are applicable to a pumped storage project at Cornwall.

250. We find that the evidence susceptible of scientific measurement is that the probabilities are that fish of a given size have the capability to resist being drawn into the system; that some of the fish life drawn into the system will survive and some will not; that the relationship of non-survival to total fishery resources is small even were there to be no survival of any of the fish life drawn into the system; that artificial propagation and conservation measures (hatcheries) can implement natural spawning.

251. A scientific method to measure precise ecological effects has not yet been devised, but the evidence on reasonably probable measurement of ecological effect is, and we so find, that no material ecological detriment will result from construction and operation of a pumped storage project at Cornwall.

The Catskill Aqueduct

252. On October 25, 1968, the City of New York (City), filed a petition to intervene in this proceeding coupled with a motion to reopen the proceeding. It stated that while it favored construction of the Cornwall Project because it would contribute to air pollution abatement, it opposed location of the powerhouse and penstocks on or near the Moodna Pressure Tunnel, a vital link of the Catskill Aqueduct.

253. The City's basic position is that there is risk of damage to the Aqueduct resulting from construction of the powerhouse.

254. Staff contends that construction at the Cornwall site will not endanger the Aqueduct, but because of the

importance of the Aqueduct to the City's water supply system the additional insurance of either a bypass or steel lining may be justified. Staff prefers a steel lining to a bypass, though its first preference is to shift the project to an alternative site within the Palisades Interstate Park (Site 2-CT) approximately a mile downstream from Cornwall.

255. Con Ed contends that the powerhouse chamber can be built safely without building a bypass for the Aqueduct or installation of a steel lining but, in any event, a bypass remedy is preferable to a steel lining, if the construction of the powerhouse is deemed a threat to the Aqueduct.

256. Scenic Hudson contends that construction at the Cornwall site imperils the Aqueduct.

257. The Aqueduct extends approximately 100 miles from the Catskill Mountains west of the river to the northern outskirts of New York City east of the river. It crosses the river at Cornwall,[22a] just south of the proposed powerhouse site, by means of a tunnel about five miles long extending from Shaft 1 on the west to Shaft 10 on the east bank. The tunnel has five different levels connected by downtake and uptake shafts. The immediate Moodna section of the tunnel starts at downtake Shaft 1 (elev. –160) and proceeds east to Shaft 7A (elev. –220 to –616) and thence to Shaft 8 (elev. –630 to –1111) all on the west bank.

[22a] See "Engineering Geology of the Catskill Water Supply", Berkey and Sanborn, Paper No. 1509, Transactions of the American Society of Civil Engineers, 1923 (LXXXVII: 1-67). It suggests that this crossing site was selected because of the excellent rock conditions which exist at this point.

During construction in 1913, leakage near Shaft 8 required a supplementary tunnel 400 feet lower (elev. –616) from a new downtake Shaft 7A to a new connection with Shaft 8. During the 50 plus years of operation since then, no further leaks have developed. The generator gallery excavation at its closest point, the southeast corner, would be approximately 139 feet from the Aqueduct; the penstocks would cross at elevation –57 or 149 feet above the Aqueduct's crown. If a bypass were constructed it would result in a minimum clearance between the powerhouse and the Aqueduct of approximately 500 feet.

Geology

258. The entire project area is within the Hudson Highlands, a mass of resistant igneous and metamorphic rocks extending from the vicinity of Reading, Pennsylvania to the Hudson River and thence east of the River into Connecticut and Massachusetts. The reservoir, pressure tunnel, and power station areas, like most of the Highlands, consist principally of ancient, precambrian granite and gneiss, overlaid with generally less than ten feet of glacial fill and a thin veneer of soil.

259. The rock underlying the project is a very large mass of dense uniform crystalline rock underlain by sedimentary rock capable of sustaining great loads.

260. Structurally, the bedrock is massive, with only slight weathering on the surface and along some joint planes. The joint planes, common in this type of rock, while usually open near the surface, rapidly tighten with depth, and are practically watertight at depths between 25 and 50 feet.

261. Three major faults, the Pagenstecher, the Clove, and the Crows Nest, lie within the general area west of the Hudson River between the Village of Cornwall on the north and West Point on the south.

262. No faults pass through the reservoir area. The Crows Nest Fault, striking northeast-southwest, intersects the surface more than a mile from the reservoir to the southeast. None of the parties assert that this fault has any significance with respect to any part of the project.

263. The Clove Fault parallels the northeast-southwest structural alignment of the region. It is partially exposed on the east side of the Hudson, but its extent on the west side of the reservoir is not discernible. While possible westward projections of this fault do not intersect the reservoir area, they could intersect the tunnel connecting the reservoir and the power station. Since the tunnel intersects the postulated fault at an obtuse angle, little or no difficulty is expected at this point. The postulated Clove Fault is entirely within the Highlands complex of metamorphic and igneous crystalline rocks, and no crushed rock is associated with the faulting.

264. The Pagenstecher Creek Fault lies to the northwest, separating the Highlands granite from the younger and weaker sedimentary rocks to the north. This fault, strikes northeast-southwest and dips steeply to the southeast. The surface and the Pagenstecher Fault intersect at a minimum distance of 8,000 feet from the reservoir site; and the fault dips beneath the reservoir at depths of anywhere between 6,000 feet and 29,000 feet.

265. The only issue raised with respect to the reservoir geology is the claim that the Pagenstecher Creek Fault might be reactivated by the weight of the water as it rises and falls in the reservoir. The fault is approximately a mile north of the proposed powerhouse site, sets in a northeast-southwest direction, and dips steeply. At a minimum 45 degrees southeasterly downward dip the base of the granite gneiss would lie nearly a mile below the generator gallery. The aqueduct was built through the fault thrust zone and there is no evidence that the fault created any such horizontal stress as to be deemed a modifying stress factor.

266. The geological evidence, in summary, is that thousands of feet of sound, tight, granitic rock and gneisses underlying the project works are capable of sustaining any loading at the reservoir, tunnel, or power station sites without any movement of the Pagenstecher Creek Fault, the Clove Fault or the Crows Nest Fault.

267. The rock formation at the proposed powerhouse site is characterized as extremely hard, strong, sound, and competent.

268. The evidence strongly supports a finding that rock conditions at the Cornwall site are excellent for project purposes.

Construction

269. The hazards to the Aqueduct which are raised by the City and Scenic Hudson are stress changes in the rock resulting from powerhouse excavation and vibrations caused by blasting.

270. Construction of the powerhouse would require removal of approximately 254,000 cubic yards of rock. The City says this would disturb the equilibrium of forces within the rock formation. City's witness Fluhr testified that, while the risks may be small, there is certainly some risk, though he admitted that his conclusions on geologic risk were largely qualitative and that he might be overly cautious.

271. The City raised the possibility that rock excavation might open crevices or joints in the vicinity of the Aqueduct subject to hydrostatic head, and lead to leakage. Leakage in fact did occur during construction of the Aqueduct, but the evidence reveals that this was caused by inadequate grouting rather than from drilling or excavation-caused saturated crevices. The preponderance of geologic opinion is that the rock in this vicinity is insoluble and relatively impermeable. Any large open joints connecting the bypass and Aqueduct could be grouted off if the experience of the original construction is typical.

272. Operation of the Aqueduct for a period of over 50 years has established that the immediate rock formations can successfully withstand all of the hydrostatic pressures and stresses involved herein. In essence, this is the conclusion of the Berkey report on the Aqueduct's geology.

273. Scenic Hudson admits that this has support in the geologists' reports but contends it is not conclusive as to the safety of the Aqueduct, pointing out the breakdown during original construction. It contends there are uncertainties in the rock and makes reference to "popping rock" as reported by Berkey.

274. The phenomenon of "popping rock" occurs in rock of this area only at depths below 1,000 feet.[23]

275. Witness Smith, a consulting geologist for Con Ed, testified that he could conceive of no possible condition in this area which would make the proposed plan hazardous from a geological point of view. He considered and rejected popping rock as a basis for concern at the relatively shallow (–220 to –616 feet) depths at which excavation for the by-pass is proposed. In the generator gallery excavation will be even shallower, to elevation –80, only 270 feet below the surface of the rock. Accordingly, "popping rock" should be eliminated as a probable hazard in this construction.

276. Dr. Paulding, a witness for Con Ed, made a photo-elastic analysis of stress conditions anticipated around the existing Aqueduct caused by excavation for the powerhouse and for the by-pass tunnel if it were built. He concluded that changes in states of stress would be approximately 11 percent and not detrimental to nor endangering the existing Aqueduct.

277. Mr. Benziger, another witness for Con Ed, found the possibility of any serious difficulties resulting from overstressed rock to be remote. This is supported by seismic tests in drill holes at the power station site which show low stress conditions to exist.

278. Con Ed presented testimony that there is no need to fear vibration damage to the existing Aqueduct from blasting to excavate the power station, discharge tunnels,

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[23] Reluctantly conceded by Scenic Hudson (Brief on Exceptions, Feb. 10, 1970, p. 28. "This may be true, although it is far from clear, . . .").

or the Aqueduct by-pass tunnel. Controlled blasting techniques will be used. Dr. Paulding, a geologist and geophysicist specializing in rock mechanics, retained by Con Ed at City's suggestion, concluded that the absence of adverse geologic conditions, coupled with the results of a photoelastic analysis of the stress conditions around rectangular openings and the results of studies of blasting vibrations, indicate that the existing Catskill Aqueduct will not be endangered either during or after excavation for the power plant or the aqueduct relocation.

279. Professor Wane, testifying for the City, made a study of the changes in stresses around the existing Moodna pressure tunnel that would be attributable to the excavation of the powerhouse gallery. He expressed the view that the existing factor of safety, whatever it is, should not be changed. He also indicated that blasting could bring about some cracking of the existing tunnel lining. His computations indicate a somewhat larger stress relief (18 percent) around the Moodna tunnel than the 11 percent computed by witness Paulding.

280. City's witness Deere considered the stress factors that would be attributable to the construction of the powerhouse gallery and concluded that there are too many unknown factors to permit an evaluation of the changes in stresses on the stability of the existing Moodna tunnel lining and adjacent rock. He did not expect that the blasting for the powerhouse gallery would cause any damage to Moodna tunnel but noted that at least there was some possibility of damage to the existing tunnel lining. He concluded that construction of the generator gallery presented a small, but real, risk to the safety of the Moodna pressure tunnel.

281. The Examiner found that computations based on photoelastic data were reasonable and that changes in stress created by excavation would be less than City's witnesses suggested.

282. The City disputes the Examiner's reliance on stress change values obtained by Paulding for Con Ed, using the photoelasticity method. It contends that he ignored its witness Deere who stressed the importance of the unknown factors and the general unreliability of theoretical stress analysis. We agree with the Examiner, however, in that the geology of the area tends to support the conclusion that stress changes are likely to be less rather than more.

283. Although the City contends that blasting for the powerhouse as close as 139 feet from the Aqueduct poses a risk, its witness Deere agreed that blasting could safely proceed to within 150 feet of the Aqueduct. He stated that while normally charges of 55 pounds per charge would not be expected to cause damage to the pressure tunnel, it is possible, depending on the condition of the tunnel lining, but unlikely, that controlled blasting may be detrimental. This basically agrees with Paulding, for Con Ed, who testified that charges limited to 55 pounds per charge would not endanger the Aqueduct.

284. The evidence, thus, reasonably is to the effect that the probability of damage by reason of blasting is remote.

285. City's other witness, Wane, was of the view that blasting vibrations could impose stresses upon an already existing state of stress, and, if there should be high *in situ* tensions or compressions in the tunnel, even small blasting vibrations could cause the tunnel to crack.

286. Witness Wane's conclusions, however, are based on two assumptions; to wit, that there is an already existing critical state of stress in the area and a high *in situ* tension in the tunnel.[24] The evidence on stress, considering the high quality of the rock formations involved herein, is that the change in presently existing stress conditions would be very slight.

287. The City excepts to the Examiner's finding that rock conditions at the site are excellent and exceptional. This exception is not only in contradiction of the preponderance of geologic testimony in the record, but is in contrast with Berkey's conclusions that no faulting of consequence exists in the vicinity of the Aqueduct and that, at the depths involved, the rock is generally very tight. The City again refers to problems of leakage in the original construction but makes no reference to the solution of the problem by adequate grouting and building of a bypass or to trouble-free operation for over 50 years. The City reiterates that there is a lack of detailed knowledge regarding the present day condition of the Aqueduct[25] and there-

[24] Wane in fact noted that since existing stress conditions around the Aqueduct are unknown "the whole matter is one for conjecture."

[25] There is no evidence concerning the condition of the Aqueduct's lining. Its structural integrity is unknown to the City or any of its witnesses.

Regarding the unknown present condition of the Aqueduct's concrete lining, it should be noted that testimony in the record relates to installation of the lining, the associated use of dry stone, and forced concrete backing and grouting, as well as the installation of pipes and valves to draw off groundwater and seepage. Both Wane and Berkey's report indicate that the tunnels were carefully designed and constructed. The use during construction of a void-filling and concrete-to-rock contact grouting leads to the assumption that the lining is securely cemented to the surrounding rock. The trouble-free operation for 50 years would indicate the same.

fore it cannot be said that it is now so structurally sound as to withstand possible stresses engendered by the construction and operation of the Project. The Examiner states that City's witness "concluded that such risk was small" but City in its exception says that its witness Deere testified "at least some possibility exists that the blasting could have detrimental effects on the tunnel lining"; that "one cannot fully evaluate what that probability actually might be"; and "there is a small, but real risk involved because of possible damage to the pressure tunnel, due both to stress change and blasting."

288. The City says that the Examiner's characterization of Deere's testimony does not include his concern for the uncertainties involved in stress calculations nor his testimony of a "small, but real, risk."

289. In questioning whether the Examiner fairly evaluated Deere's testimony, the City did not include this pertinent part of his direct testimony:

"Q. Will blasting in the generator gallery cause damage to the existing pressure tunnel?

"A. I believe that it is possible, but unlikely, that blasting if restricted and properly controlled, will cause damage to the pressure tunnel."

290. We conclude that the evidence in the record indicates that the probability of damage to the Aqueduct is remote and that a by-pass is not required.

Section 27 of the Federal Power Act

291. Involved in the Aqueduct issue is Section 27 of the Federal Power Act, which states that the Act is not in-

tended to affect or interfere with State laws relating to control or distribution of water used for municipal purposes or with any vested right acquired therein.

292. It is City's position that any damage to the Aqueduct, whether created during or subsequent to construction, threatens the health, safety, and welfare of its citizens and is an interference with the City's duty to provide its citizens with an adequate supply of water and would violate Section 27 of the Federal Power Act.

293. Scenic Hudson contends, though the City does not, that construction of the powerhouse and penstocks would violate the restrictive covenant in the deed from the City to the Park limiting drilling to depths not exceeding 200 feet below the surface. It asserts Section 27 is applicable and prohibits Con Ed from violating this.

294. Although we believe that Scenic Hudson has no standing in a controversy regarding a covenant in a deed, it is not necessary to rule on its standing, since we conclude that Section 27 preserves only the right of compensation. *Portland General Electric Co.* v. *F.P.C.*, 328 F.2d 165 (1964); *California* v. *F.P.C.*, 345 F.2d 917 (1965). Thus, while the City's right to compensation is not abridged, we find that Section 27 does not preclude our licensing this project without the City's consent.

295. The arguments regarding Section 27 primarily relate to the by-pass and are largely moot, since we do not require a by-pass, based on our findings that construction of the powerhouse will not endanger the Aqueduct.

296. But even were a by-pass required to protect the Aqueduct, Section 27 does not require the City's consent. That any temporary loss of water because of Aqueduct shutdown during construction of a by-pass can be supplied from alternate sources is amply demonstrated by the testimony of record. In addition, the Aqueduct could be rewatered and restored to service in only 60 hours should such alternate sources fail and the need for the Aqueduct's water actually arise before completion of the by-pass. Work on the by-pass could then be resumed at a later date when alternate sources are again available. Any actual spillage of water could be compensated for.

Upper Reservoir

297. The upper reservoir as projected will cover a surface area of approximately 240 acres and, at maximum water elevation (1160 feet), have storage capacity of 25,000 acre feet (approximately 8 billion gallons of water).

298. Located on the eastern edge of Black Rock Forest about 2 miles southwest of the proposed power plant, it will be formed by five rock-fill dikes varying in height to 275 feet above ground, placed in saddles between ridges comprising a smaller natural basin formed by White Horse Mountain, Mount Misery, and Hill of Pines. This depression has been utilized as part of the Village of Cornwall's water supply.

299. The maximum depth of the reservoir will be approximately 310 feet, and the reservoir level will fluctuate daily. Since the rocks of the reservoir bottom and in the dike foundations are gneissoid granite, and are only slightly weathered, stability of the foundation is most probable.

Taking into account the many cubic miles of solid granite on the southwest side of this fault and beneath the reservoir site, together with the geologic stability of the area, there is little doubt that the reservoir foundation is extremely stable.

300. The reservoir would be impounded by five earth-rock fill dikes. Their crests would be at elevation 1173 (13 feet above maximum water elevation) except dike No. 3 which would have a crest elevation of 1170 feet. The dikes are designed so that they may be raised to accommodate a reservoir with a maximum water elevation of 1,210 feet, should an increase in project capability ever be authorized.

301. The evidence is that there is no material which is absolutely impervious, but the dikes are relatively impervious. In terms of coefficient of permeability this is something less than 2×10^{-6} feet per minute which is approximately the permeability of ordinary concrete. Thus the dikes, being equivalent to concrete in terms of permeability for all practical purposes, should be watertight in the ordinary sense of that term. Such seepage as may occur should be very small and spread out over the entire length of the dikes. Consequently it will tend to evaporate before it reaches the toes of the rock-fill. To prevent seepage through any joints in the granite bedrock beneath the dikes and render it more impervious, it is planned to grout, *i.e.*, inject a mixture of cement and water under high pressure, any joints in the bedrock through which seepage could occur.

302. The Presiding Examiner concluded that the upper reservoir would be safe, stable, and virtually watertight. Further, seepage would be minimal and not sufficient to

adversely affect dike safety, ground water, or plant life. No exceptions are taken by any party to this engineering or ecological aspect of the initial decision. Exceptions relating to the upper reservoir are limited to its aesthetic or environmental impact.

Aesthetic and Environmental Impact

303. The project's proposed upper reservoir will be located in part on privately owned lands, in part on lands owned by the Village of Cornwall, and in part in Black Rock Forest, a 3,700 acre experimental tract of timber owned by Harvard University. Reservoir construction will require acquisition of about 240 acres at the east edge of the forest. The remaining 3,400 plus acres will be unaffected. The forest has been cut over extensively several times and presently consists of second growth timber, among which are no species of rare plants or trees.

304. The reservoir and dikes (maximum elevation 1173 feet) would be visible from various higher points within and outside the forest ranging from nearby White Horse Mountain at elevation 1240 feet to the Schunemunk Mountains 5.75 miles away at elevation 1664 feet. The aesthetic impact of the reservoir and dikes is dependent in large measure on the vantage point and varies in relation to the elevation and distance of the view. The impact is also dependent upon and related to other views which impinge on the vantage point. The reservoir would be located in an area of great natural beauty and scenic grandeur, but that it is not a wilderness is admitted by both Scenic Hudson and the Sierra Club. Although most vantage points overlook-

ing the reservoir are not easily accessible,[26] and the vistas which present themselves at these elevations contain magnificent views, the views in many instances must also include residential, commercial, and industrial development.[27]

305. There are a number of hiking trails in Black Rock Forest and its immediate vicinity. Applicant proposes a relocation of approximately 2 miles of the three trails which would be inundated in the area between Hill of Pines and Mount Misery. No existing trail will end at the reservoir.

306. The forest is not open to the public, but hiking is ordinarily allowed, though not overnight camping or fires. In the past only two of the six ponds in the forest were available for fishing. The others were used for water supply. However, the Village of Cornwall has constructed a filtration plant to filter its reservoir supplies as part of its water supply redevelopment program. Henceforth the four remaining Village water supply reservoirs should be available to local sportsmen.

307. The reservoir of 240 acres would be larger than any of the surrounding lakes or ponds, and Scenic Hudson claims it would dwarf the scale of the natural scene and be incongruous with the character of the Highlands. We find,

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[26] The surface of the reservoir is not visible from the river or from any highway, though Dike No. 3 could be seen from a relatively short stretch of highway across the river at a distance of over two miles.

[27] For example, the Hudson Highlands in the vicinity of the project are traversed by the New York Thruway and Route 9-W, both built to Interstate Standards, as well as by the old Storm King Highway (Route 218) which most directly impinges on the project area. The railroad tracks along the edge of both sides of the River have perhaps the most visual impact on the Highlands.

however, that in the scale of the area it does not reasonably appear to dwarf the scene. Nor should it be materially different in appearance from ponds in the area and thus should not be deeemed incongruous with the present character of the area.[28]

308. The Sierra Club contends that the reservoir would drown a scenic valley, in which there is presently located a small pond, flooding out two hiking trails. The water level in the valley would be raised from the present level at elevation 900 feet to elevation 1160 feet, but this rise will not result in drowning out the valley. Relocation of a small segment of the hiking trails is substantially different from the connotation "flooding out two hiking trails."

309. The Sierra Club admits some effort might be possible to disguise the outside of the dikes and their tops, but claims nothing could disguise the ugly inside of walls of mud, exposed as the level of the reservoir rises and falls. What the Sierra Club denominates "walls of mud" is actually "rock fill". In any event, regardless of whether the interior walls of the dikes are mud or rock fill, the issue is whether the material is so different from surrounding areas as to materially alter the natural scene. We conclude that the rock and earth comprising the dikes would not appear to be out of character with the scrub growth, rock outcroppings, bare spots, and trees which are all part of the Highlands. The plantings and natural growth which would adhere to the exterior and possibly interior surfaces of the dikes would also serve to ameliorate any intrusion of the reservoir and dikes on the natural scene.

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[28] All the large ponds in the area are artificial, the nearest natural lake being in the vicinity of Bear Mountain.

Alternative Sites

310. Pursuant to the Commission's order of November 19, 1968, the reopened proceedings included evidence reasonably calculated to apprise the Commission whether an alternate site was a proper and preferable alternative location.

311. Only Staff and Con Ed conducted studies of the technical and economic feasibility of relocating the power station site while using the same site for the storage reservoir.

312. Staff originally suggested construction of an underground power station at a site (Site 2) about one mile and a half south of the Cornwall site (Site 1) proposed by Con Ed. Site 2, opposite Little Stony Point, is located at the foot of the north spur of Crows Nest Mountain, under and within lands of the Palisades Park in an area of great scenic beauty.

313. Staff subsequently modified its proposed alternate site by shifting it approximately 2000 feet upstream in the southern portion of the Clove (Site 2-CT). Basically, the only difference between Site 2 and Site 2-CT is the relocation of the tailrace. The location of the powerhouse, tunnel, manifold, and penstocks in Site 2 and Site 2-CT is situated underground in approximately the same area and rock formation, with only a slight change in the alignment of the components.

314. Con Ed, while preferring Site 1, contends that Site 2 is an acceptable alternative.

315. Site 2 would provide for shorter tunnels and a shorter underwater river crossing. It would also require

less excavation and cut than Site 1 as well as elimination of an open tailrace.

316. Because the Palisades Park Commission opposes construction within park lands, it refused Con Ed permission to make borings in the site area. Accordingly, the geologic evidence regarding Site 2 and Site 2-CT is limited to surface investigation and the technical literature on the region's geology. In essence, the geologic evidence is to the effect that the site is a part of the prevailing metamorphic and igneous mass of granite and bonded gneiss present at Cornwall. Massive and homogenous, it appears to have the same quality, strength, and structure as the rock at Site 1.

317. Scenic Hudson excepts to any conclusions regarding geologic feasibility at Site 2 without subsurface investigation but we conclude, based on the geologic evidence of the rock mass in general, that there should be no substantial problems in constructing an underground powerhouse at Site 2.

318. Although more expensive than Site 2, Staff contends that its Site 2-CT tailrace location offers several advantages over Site 2. These claimed advantages are (1) reduced visibility of tailrace area; (2) facilitation of, and shallower cofferdam construction; and (3) increased work area to permit railroad hauling of underground excavation materials.

319. The removal of talus cover is strenuously objected to by Scenic Hudson in its opposition to Site 2. Admittedly, Site 2-CT would not require the removal of talus cover over an area above the tailrace as would be required for Site 2.

320. Although the removal of the talus cover is avoided at Site 2-CT, the only firm advantage of Site 2-CT as against Site 2 is that cofferdam construction is facilitated. This advantage is offset by the increased cost of Site 2-CT over Site 2, as well as the fact that Site 2-CT is close to a potential camp site whereas Site 2 is quite unsuitable for such purpose. The unweathered rock which would be revealed if the talus is removed can be covered with vines in the event that such rock is in contrast to the more weathered rock.

321. The overall underground area to be occupied by Site 2 would be approximately 34.4 acres, with approximately 2.5 surface acres of access road and 7 to 8 acres of steep slope. Because of its steepness, the surface area involved is for the most part inaccessible to all but the most agile. Though not far below Storm King Highway, because of the terrain most of the traveling public is as unaware of this part of the Park as of its more remote areas.

322. Site 2 is not presently developed as a park but the Park Commission has under consideration a study made as to the future use of this area of the park land. In this regard, Site 2-CT offers more potential for a campsite since the area at the base of the Clove is less steep than Site 2 which offers almost no potential as a future campsite.

323. Construction at either Site 2 or Site 2-CT would eliminate the issue of potential hazard to the Aqueduct but the topography at Site 2 prohibits public access to the powerhouse and recreational development at the powerhouse location. No matter at which site the powerhouse is

constructed, Con Ed will fill and landscape the waterfront at Cornwall and deed it to the Village as a park, presumably in partial payment for acquisition of the Village's upper reservoir.

324. Witness Wirth, former director of the National Park Service, for the Palisades Interstate Park Commission (Park Commission) contended that a project at Site 2 would be contrary to public policy against use of park lands for industrial purposes and would be destructive to the purpose of natural beauty to which the park is devoted.

325. The Park Commission asserts that construction of the project at either Site 2 or Site 2-CT would constitute a highly visible encroachment on the scenic beauty of that portion of the Park, pointing out that plans call for construction of a tunnel entrance rising almost 40 feet above the present railroad bed, with the tunnel opening itself some 30 feet in height above the railroad bed. Testimony by witnesses Wirth and Atkinson on behalf of the Park Commission and Scenic Hudson was, in substance, that no screening would be effective. They pointed out that danger to the beauty of the Highland region flows from the bridge structure, the portal entrance, and the retaining walls which would occupy a substantial length of the river front and thus would be highly visible across a narrow portion of the river.

326. What the Park Commission and its witnesses do not point out, however, is the advantage which Site 2 offers as against Site 1. It will essentially not be visible from across the river. Further, Site 2's bridge structure and abutment would be located on or along the existing railroad right-of-way and thus would not materially alter the present appearance.

327. It is the Park Commission's position that public policy, both state and federal, bars the use of parkland for industrial purposes. This policy, as expressed in the Palisades Interstate Compact,[29] it asserts would preclude licensing of the project on park land. The Park Commission contends that the 1922 amendment to the Federal Power Act which prohibits licensing of power projects within national parks without the express consent of Congress is another manifestation of public policy in this area.

328. The Park Commission claims that the Compact, as Federal legislation enacted subsequent to the Federal Power Act, should be regarded as a modification of the Act. But even if the Compact is thought not to be the kind of Federal legislation which would limit absolutely the powers of the FPC, it says approval by Congress of the terms of the Compact certainly amounts to a further expression of the national policy against use of park lands for non-park purposes.

329. The Park Commission does not object to the limited easement necessary for the penstocks to pass beneath park lands should the project be located at Site 1.

330. The Park Commission's opposition to the use of Site 2 is joined in by Scenic Hudson and Sierra. Objec-

[29] The Compact between New York and New Jersey which created the Park Commission provides that the park shall be maintained as an interstate park for use by the public and preservation of scenic beauty, with the land to be used only for public park purposes. However, easements may be granted if in the opinion of the Commission they will not interfere with the public use and enjoyment of the park. In any event, the Joint Resolution of the Congress consenting to the compact provides that consent was not to be construed as impairing or affecting any right or jurisdiction of the United States in or over the area involved.

tions, in addition to the use of park lands for industrial purposes and that the project facilities would permanently scar the landscape, are also to the effect that the project would be in conflict with a comprehensive development of the River and the Hudson Valley. An aesthetic impingement on the Hudson Highlands State Park, located on the east side of the river at Little Stoney Point, is also alleged.

331. The Park Commission, Scenic Hudson and Sierra oppose Staff's Site 2-CT for much of the same reasons that they oppose Site 2.

332. The Examiner found that an installation at Site 2 would be visible across a relatively narrow portion of the river and that on the evidence available he could not conclude that the project would not have an adverse effect upon the scenic aspect of the mountain and cliff.

333. Because Site 2-CT would also have visible structures and shorefront features which might impair the natural beauty of the area from the area directly across the river in the same manner as the view relating to Site 2, and because Site 2-CT might even more directly conflict with the Park Commission's eventual development of the area for recreational use, the Examiner found that Site 2-CT was no more favorable than Site 2 as an alternate location.

334. The record establishes that the public interest will be substantially advanced by licensing this project. It also establishes that the location of the powerhouse at either Site 1 or Site 2 is appropriate, though each site has an alleged drawback not common to the other. In regard to Site 1, it is alleged it presents a hazard to the Catskill

Aqueduct. In regard to Site 2, it is alleged it will infringe on the Palisades Interstate Park, as well as on the Hudson Highlands State Park across the river.

335. We find that Site 1 is an appropriate site for the project and issue a license authorizing construction at that location. We also find that location of the powerhouse at Site 2 is appropriate and would not substantially or seriously impair the present or future utilization of the Palisades Interstate Park for park and recreational purposes nor unduly infringe on the Hudson Highlands State Park. We therefore issue a license authorizing location of the powerhouse at Site 2 in the event that a court upon a petition to review does not affirm our order licensing Site 1 and the applicant is precluded from proceeding with construction at Site 1.

336. We find that Site 2 is an appropriate site for the reasons that the proposed Site 2 project works would involve minimal use of surface lands of the Palisades Interstate Park which would be landscaped further to reduce any resulting impact. We conclude that the underground powerhouse would not appreciably affect the view from the east side of the Hudson River or the scenic beauty of the area.

337. Not only is the geology at Site 2 feasible, but for the reasons we set out in our discussion of the fishery issue the location of the project at Site 2 also would have no adverse effect on river fishery.

338. Further, for the reasons set out in our consideration of whether the project is the one best adopted to a

comprehensive plan for improving or development of the waterway pursuant to the requirements of Section 10(a) of the Federal Power Act, the location of Site 2 would have the same consequences as a location at Site 1. The scenic overlook and the waterfront park facilities would be the same whether Site 1 or Site 2 was selected.

339. The only historic sites in the near vicinity, West Point and Constitution Island, would not be affected adversely by the project from a visual standpoint.

340. While the project would entail a temporary interference with a part of the Palisades Interstate Park during the construction period, it would be incidental to the public interest served in supplying a reliable and non-polluting source of electric power to the City of New York.

341. Location of certain project works underneath lands of the Palisades Interstate Park would be a beneficial dual use of a natural asset. The surface of the land would still be essentially used for a state park and the subsurface would be used to serve the needs of additional millions.

Transmission Facilities

342. A principal part of the proposed project is the transmission facilities crossing the bed of the Hudson River and continuing easterly and southerly to a point and switching station on Con Ed's existing right-of-way to a connection with Con Ed's primary transmission system at Sprain Brook substation in the City of Yonkers, N. Y. The precise nature and routing of the transmission facilities on the east side of the river to a connection with the Pleasant Valley-Millwood right of way is a matter of controversy.

Undergrounding

343. In remanding this case for further proceedings, the Court of Appeals ruled that the Commission should inquire into the capital and annual cost of running segments of the transmission line underground in those areas where the overhead structures would cause the most serious scenic damage and that the Commission should weigh the aesthetic advantages of underground transmission lines against the economic disadvantages. 354 F.2d at 623.

344. Accordingly, in the reopened proceeding, the extent to which transmission should be placed underground was exhaustively considered.

345. The topography of the area is such that at the higher elevation between the river and Route 9 (McKeel Corners) both the river and the tower lines would be visible from certain points but from the river itself the towers would not be visible. Along Route 301 between the river and McKeel Corners the views, while attractive, certainly cannot be compared to those in the gorge. The gorge itself cannot be seen from Route 301 between McKeel Corners and Nelsonville, though when driving on Route 301 one can obtain various views of portions of Storm King Mountain and Bull Hill.

346. The Perry's, whose property is located on Route 301 about ¾ mile west of McKeel Corners, assert in their brief that overhead transmission lines would mar their presently uninterrupted view of West Point, Storm King Mountain, Storm King Highway, and Bull Mountain, and such lines would diminish the value of their property. The lines between Cornwall East and McKeel Corners would

also, they contend, significantly impair the beauty of the immediate area for an increasing number of travelers who seek good scenery and pleasant surroundings. They contend "The rural charm along Route 301 would be replaced, in substantial part, by the harshness of the transmission towers and lines."

347. In support of its contention that the entire transmission line in the Town of Philipstown should be underground, the Town argues that the area of Route 2 (modified) is one of great beauty and aesthetic integrity and asserts that if part of this area is bisected by ugly transmission lines and towers, with the ravenous swath of a right-of-way to display them, the entire atmosphere of the area will be downgraded.

348. Scenic Hudson says that overhead transmission wires and the cuts of their supporting right-of-way could not help but seriously damage the rugged rural beauty of Putnam County. It says this damage would be all the more objectionable for its impact on open space so close to New York City and already so quickly disappearing.

349. Scenic Hudson, while agreeing that undergrounding to McKeel Corners would be an improvement, argues that it would provide no answer to the damage to be done to the rest of Putnam County. It decries the subordination of natural beauty to the economics of the project, saying that the whole project should be rejected by the Commission, and that, if it is not, the transmission line ought to run underground all the way to Kent.

350. The preservation of natural beauty in the area between Cornwall East and McKeel Corners, however, does

not make undergrounding mandatory. Even with overhead transmission lines roughly paralleling state highway 301, the area will remain what it now is—scenic and pleasant, with open farmland and orchards and partly wooded with some brooks. To say that this will be seriously damaged or destroyed by an overhead transmission line is not consistent with reality.

351. In granting Scenic Hudson's petition and remanding the proceedings "to adduce additional evidence concerning the cost and practicality of underground transmission facilities", the Court stated "in our affluent society, the cost of a project is only one of several factors to be considered." Accordingly, we do not read the Court's remand to be that costs should be ignored, but rather that cost is one of several factors to be considered. To that end, in the remanded proceedings, Con Ed presented several witnesses regarding the cost of the various proposed underground transmission routes.

352. To underground the 1.9 miles between Cornwall East and McKeel Corners, Con Ed's witnesses estimated that the additional capital cost would be $9,300,000. The Staff estimate of $8,930,000 for the underground circuits in this area is approximately 4.7 million dollars a mile. To extend the undergrounding east of Route 9, as suggested by the Town of Philipstown, would involve an additional cost of $2,165,000.

353. Witness Kusko, for Scenic Hudson, testified that in his opinion the cost of an underground line would be less than Con Ed's estimate.[20]

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[20] His cost figures are based on a four cable system, whereas witnesses Gross, Shew for Con Ed, and Jessel for Staff all were in agreement as to the necessity of a five cable system.

354. Maintenance expense on underground transmission is estimated to be approximately $1,000 per 100,000 kw of capacity per mile on a single circuit. On this basis, the transmission of approximately 2000 mw of Cornwall capacity 1.9 miles, between Cornwall East and McKeel Corners would result in a cost of $38,000 per year. It is claimed the cost would even exceed this, however, because of the multiple circuits required, resulting in reduced capacity of each cable and the difficulty of working on one of two cables in a common trench. The cost of maintenance for an overhead line would be less than $100 per 100,000 kw of capacity per mile, or less than 1/10th of that required for an underground line. The annual differential in maintenance expense alone would thus approximate $34,000 per year, exclusive of fixed capital costs. When capital costs are included, Con Ed's witnesses assert that undergrounding between Cornwall East and McKeel Corners would add an additional $1.1 million annual cost (11.9%).

355. Staff has estimated that underground lines cost approximately 16 times as much as overhead lines at 345 kw. The relative costs of undergrounding can be appreciated from the fact that the problems inherent in transmitting power underground at high voltages are not simply a matter of putting an overhead transmission line, which is normally a bare uninsulated metal conductor, into a trench. The phenomena of heat buildup and condenser (or capacitance) effect require that underground cables be an entirely different piece of equipment.

356. The costs of underground transmission are high in relation to the costs of overhead circuits of the same voltage because the greater complexity of underground cables

results in greater labor and material costs.[31] Underground cable circuits for the same conductor size and voltage rating have a lower transmission capacity, in the ratio of about 1 to 4, because of problems associated with dissipating heat through insulating material consisting of oil-saturated paper about which is enclosed a metallic protective jacket requiring special corrosion treatment. The oil must be maintained at high pressure to prevent ionization, which in turn requires one or more pumping plants. Dual circuit underground cables must be laid in trenches averaging from 5 to 6 feet deep. The preparation of the cable requires highly skilled labor for the preparation of joints between cable lengths, which vary between 1600 and 2000 feet. In order to enhance their heat-dissipating properties, it is required that these cables be covered with special mix of sand so that a uniform heat-dissipation pattern may be obtained for conducting away the heat leaving the cable cover surface.

357. Underground cables also have electric characteristics which require them to transmit a substantial amount of useless "charging current." This capacitance effect which could utilize the entire current carrying capacity of the cable can also result in dangerously high voltage deviations during sudden load changes which may occur. To make it possible for these cables to transmit only useful current, it is necessary to install at relatively close locations, about 2 or 3 miles apart, large magnet-type coils which have the property of cancelling out the useless current which otherwise flows in the cables. The actual installation of under-

[31] See FPC Advisory Committee Report, Underground Transmission, April, 1966.

ground cables requires precision controls and evacuation techniques so as to eliminate to the greatest extent the intrusion of gases within the cable which would have a tendency to cause their breakdown.

358. Because of the limited length of conductors that can be pulled through a pipe, splicing is required, which involves a high degree of skill to assure even distribution of electrical stress and carefully controlled conditions to assure cleanliness and avoid moisture. The resulting cable still has lower load carrying capacity than an overhead conductor of the same size. Therefore, multiple underground circuits will be required as an alternative for each overhead circuit to carry the same amount of power and energy. It is these electric properties and the thermal problems, as well as the highly skilled labor requirements, which account for the great difference in costs between underground and overhead transmission lines of the same voltage classes.

359. Technically, overhead lines have more outages than underground because a lightning flash can result in a temporary opening of the line, but since this is generally followed by immediate automatic reclosure there is normally no disruption in service. Outages on an underground cable, while less frequent, usually result in its being out of service much longer than an overhead line because of the difficulty of locating the failure, excavating the damaged area, and the time-consuming splicing job required. Because of the duration of outage, most underground cables are part of a network system in which the needs can be met from more than one cable.

360. It is thus apparent that only for the most cogent reasons, as where no feasible alternative is possible or

where the aesthetic detriment is so violent as to preclude any consideration of overhead transmission facilities, that undergrounding should be required.

361. It may well be that an underground transmission line is aesthetically preferable, but merely because it is aesthetically preferable is a far cry from a conclusion that failure to underground will create such serious damage as to warrant the increased charges to consumers. While recognizing the unique grandeur of the Hudson River and the Highland gorge through which it cuts, we cannot attribute this same uniqueness to the area east of Nelsonville. The beauty of the area in the vicinity of Route 301 is a beauty to be found throughout the Highland and Catskill area and indeed much of upper New York State. We would not countenance the destruction or serious damage to any of it. Nor do we believe it is in the public interest to burden consumers with the cost of undergrounding unless it were necessary to prevent such destruction or serious damage.

362. The record testimony reveals that except in infrequent instances no measurable price differentials were found among otherwise comparable properties that could be associated with power line proximity. Such variations as do exist appear to be eliminated with the passage of time. Tax records show no reduction in assessed values due to proximity of overhead lines. There is, however, some indication of a tendency of some builders, lenders, brokers, and appraisers to adopt a negative attitude as to tower line rights-of-way, and properties screened from view of tower structures are somewhat more marketable than those not screened.

363. In essence, given a preference, a property owner or purchaser would tend to prefer not to have a transmission right-of-way in his vicinity, but the impact is not substantial and tends to diminish with the passage of time.

364. Philipstown disputes Con Ed's contention that the approximately $1 million annual cost for additional undergrounding to McKeel Corners is out of proportion to any arguable benefit derived. It says that Can Ed is selfish and is unwilling to preserve the natural beauty even though it can be done without increasing its rates. That is so, says Philipstown, because Staff estimates annual savings on the project will be more than $16 million and therefore an annual expense of $1 million for additional undergrounding will still allow Con Ed an annual profit in excess of $15 million. Philipstown says "we can afford to extend the underground the entire length of Route 2 and still have an annual profit of more than $10 million."

365. Philipstown, of course, confuses "savings" which relate to costs of operation over theoretically comparable generating capacity, with "profits" to be earned from this additional generation.

366. One of the more beneficial aspects of Cornwall is that it will generate electricity at a cost less than any feasible alternative. This cheaper generation can redound to the benefit of many economically disadvantaged consumers in New York City. To the extent that this economic advantage is dissipated or frittered away, the many poor will pay for the benefit of the few affluent. There is no doubt that costs are charged to users. The higher the cost the more the charge. We have a heavy responsibility to see that

the charge is kept as low as possible consistent with the public interest.

367. In this proceeding, we find that there will be no destruction of or serious damage to the scenic beauty of the area in the vicinity of Route 301, and we find it would therefore be an unreasonable and unnecessary burden to impose the cost of undergrounding east of Nelsonville. The public interest in a reliable supply of bulk power under section 202(a) of the Federal Power Act and associated economic benefits overrides the inconsequential environmental detriment of the project.

Alternative Transmission Routes

368. Extensive evidence on a number of alternative transmission routes between Cornwall East and Sprain Brook was introduced by various parties during the earlier proceeding in May 1965. At the remanded 1966-1967 hearings additional evidence was largely devoted to the routes advocated by Con Ed (Route 3) and by Staff (Route 2 and modification thereof).

369. Con Ed, which during the proceeding had advocated a route previously licensed by us, now supports the route which Staff suggested and which the Examiner would license.[32] Along this route the transmission line would extend as follows:

(a) From Cornwall East to Nelsonville, northeasterly paralleling N. Y. State Route 301 to a point a short distance west of McKeel Corners in the Town of Philipstown;

[32] Designated in the record as Alternate Route 2.

(b) Thence following the valley of a stream which flows between East Mountain and Round Hill, generally northeasterly, to Wiccoppee Pass, said stream being located near Glywood Farm with water surface elevation of five hundred and eighty-one feet;

(c) Thence continuing northeasterly, staying northwest of Fahnestock State Park and Taconic State Parkway at least one-quarter mile, to a point on the existing Pleasant Valley-Millwood transmission line corridor northwest of the Taconic Parkway in the Town of Kent in Putnam County;

(d) Thence south on the existing transmission line corridor from the connection to Sprain Brook.

370. The point of intersection would be approximately one mile north of Fahnestock Park in the Town of Kent in Putnam County. The location of the connection at Kent with the presently existing transmission corridor has the advantage of utilizing an existing cross-over to the east side of the Taconic State Parkway. The distance from Cornwall East to Kent is approximately 9.2 miles; Cornwall East to Sprain Brook is approximately 50 miles.

371. A variation in this route, designated as "Perry Modification Route No. 2", would consist of a shift in the overhead line north as it leaves Cornwall East. Under this proposal, the overhead transmission line would proceed from Nelsonville north by east, along the south and southeast slopes of Bull Hill, past the Catskill Aqueduct pumping station on Bull Hill, and continuing north of Foundry Brook Road to the vicinity of North Highland. At this point the route would continue northeasterly, past East Mountain,

joining Route #2 in the vicinity of Wiccoppee Pass. This modification adds approximately a mile to Route 2 and would cost an additional $200,000.

372. The record reveals that once Route 2 leaves McKeel Corners the land traversed is owned by only three large property owners and would follow more valleys than the proposed Perry Modification which goes through more of the mountain land.

373. The area of Putnam County traversed by alternate Route 2 is far less developed than the areas in the towns of Philipstown and Putnam Valley through which Con Ed originally proposed to route its transmission facilities. For this reason the towns which oppose Route 3 agree that if the license is issued the project should follow Alternate Route 2.

374. Although Route 2 (and alternates thereof) is approximately 5 to 6 miles longer in the aggregate than Route 3, it would require approximately 4 miles less of new transmission corridor. That is so because it utilizes a greater length of the existing Pleasant Valley-Millwood corridor.

375. On the whole the area traversed by Route 2 is rough, wooded, and hilly. More importantly, its valleys lie in a northeasterly direction and are oriented so as to provide the possibility of locating lines below crests. In addition to its extra length and cost, we reject the Perry Modification because utilization of lower elevations serves to minimize scenic impact. The forested character of the area provides to a degree natural screening for the transmission line and towers. Finally, not only is the area of Route

2 less developed than other potential routes and likely to remain so, but in the area east of McKeel Corners no objection has been interposed to Route 2 as having significant adverse local effects.

376. We find that of all the potential alternative routes, Alternate Route 2 presents, on balance, the most desirable routing in that it will impinge less on the area through which it passes than would any other route. Further, the route takes advantage of a present transmission crossing of the Taconic State Parkway which under other routings would require an additional crossing. Accordingly, we license Alternate Route 2 for project transmission.

The Commission further finds:

(1) In arriving at its judgments herein, the Commission has given full weight to the public interest consistent with our obligations under Sections 4(e) and 10(a) of the Federal Power Act and with an awareness that the needs of our expanding population for adequate and reliable electric service must be reconciled with the need to conserve our dwindling areas of unspoiled natural beauty.

(2) Within the terms and meaning of Section 10(a) of the Federal Power Act, the project as herein conditioned and approved will be best adapted to a comprehensive plan for improving or developing the Hudson River for the use or benefit of interstate commerce, for the improvement and utilization of waterpower development, and for the other beneficial public uses, including recreational purposes.

(3) The Cornwall project has large advantages over any other method of meeting the applicant's need for additional peaking power and to enable it to meet its responsibilities to provide the public with reliable electric service.

(4) The impact of the project on the surrounding area is minimal, while the need for electricity from this economical and dependable source is great.

(5) On balance, the issuance of a license appropriately conditioned to avoid unnecessary harm to the landscape or to other public or private interests, for the construction, operation and maintenance by Con Ed of Cornwall project is desirable and justified in the overall public interest and that such license should be granted.

(6) Con Ed is a corporation organized and existing under and by virtue of the laws of the State of New York and has submitted satisfactory evidence of compliance with all applicable laws of that State to the extent necessary to effectuate the purposes of the application herein and of the license to be issued in this proceeding.

The application filed on January 29, 1963, and thereafter amended on September 13, 1963, and May 31, 1966, is made for a license under the Federal Power Act which would authorize the construction, operation, and maintenance of a hydroelectric development to be known as the Cornwall Pumped Storage Project, Project No. 2338, which would be located on the Hudson River approximately 40 miles north of the City of New York, in part in the towns of Cornwall and Highlands, respectively, in Orange County, New York (known as the Cornwall site) and appurtenant project works including the necessary transmission facilities.

(7) The proposed Cornwall hydroelectric generating plant would be located in and along the Hudson River, a navigable water of the United States.

(8) Appropriate public notice was given of the instant application. There is no competing application on file with the Commission for a license for a hydroelectric development in the Cornwall reach of the Hudson River.

(9) The issuance of a license for the Cornwall project as hereafter provided will not affect a Government dam or the development of any water resources for public purposes which should be undertaken by the United States.

(10) The installed horsepower capacity of the project as hereinafter authorized for the purpose of computing the capacity component of the administrative annual charges is 2,667,000 horsepower, and the amount of annual charges, based on such capacity, to be paid under the license for the project for the cost of administration of Part I of the Federal Power Act is reasonable as hereinafter fixed and specified.

(11) The present and the future electric energy requirements of applicant's present and potential consumers require the construction and operation of the proposed project.

(12) The project proposed and as authorized in the order issued concurrently herewith is feasible from an engineering and economic standpoint, and the construction and operation thereof in the manner and for the purposes proposed by applicant as authorized herein are in the public interest.

(13) The project as proposed, with an initial capability of 2,000,000 kilowatts, but with provision for future expansion to at least 3,000,000 kilowatts, will be best adapted to a comprehensive plan for improving and developing the Cornwall reach of the Hudson River for all beneficial purposes.

(14) The project works as proposed and as authorized in the order hereto attached will be safe and stable.

(15) The project upper reservoir would be located some two miles from, and west of, the Hudson River.

(16) The construction of the project upper reservoir will not adversely affect, to any significant extent, the natural beauty, the historical significance, or the recreational opportunities of the area in which it would be situated, but the recreational advantages of such area would be enhanced thereby.

(17) The dike facing Clove Creek and forming part of the project upper reservoir should be at least three feet lower than the other dikes.

(18) There is no danger of seepage of any significant quantities of water out of the project reservoir, but applicant should install observation wells in the immediate vicinity of the project reservoir dikes to measure any seepage that does occur, sample the water in wells, ponds, and streams in the area before and after construction, and take appropriate measures to correct any conditions of significant seepage.

(19) The Hudson Highlands is an area of great natural beauty, having historical and artistic significance and exceptional recreational opportunities. There are important historical remains and reconstructions at points along the Hudson River from Newburgh to West Point, but no such remains or reconstructions are in the immediate vicinity of the project works.

(20) The construction of the project power plant at either Site 1 or alternative Site 2 would not adversely

affect, to any significant extent, the natural beauty, the historical significance, or the recreational opportunities of the area in which such plant would be situated.

(21) Alternative Site 2-CT is not best adapted to a comprehensive plan for improving or developing the waterway for the use of interstate or foreign commerce, for the improvement and utilization of waterpower development, and for other beneficial public uses, including recreational purposes.

(22) Project power will be generated at about 18,000 volts and transformed to 345,000 volts at the powerhouse.

(23) The power will be transmitted across the Hudson River by four submarine cables (comprising two 345 kv circuits) approximately 4,200 feet in length; two additional submarine conduits will be constructed to meet future needs.

(24) Underground cables of essentially the same design as used for the river crossing will extend on the eastern shore of the river from the end of the submarine cables a distance of 1.6 miles to the Cornwall East terminal point at Nelsonville.

(25) To transmit the power which would be generated at the Cornwall project, applicant should construct and operate as parts of the project within the meaning of Section 3(11) of the Federal Power Act. 345 kilovolt double circuit overhead transmission line on a right-of-way, the location and width of which is to be as provided in the accompanying Order, extending from the Cornwall East terminal point at Nelsonville to a switching station near Kent and thence to a point of interconnection with appli-

cant's transmission system at or near its Sprain Brook substation.

(26) The route of the overhead transmission lines specified in the accompanying Order is the single route most in accord with the public interest and satisfies the standards embodied in Section 10(a) of the Federal Power Act.

(27) The construction and installation of the overhead transmission facilities specified in the accompanying Order will be in accordance with recognized guidelines for protecting the environment of the transmission line right-of-way.

(28) The project will not adversely affect the fish resources of the Hudson River provided adequate protective facilities are installed and the facilities now planned for inclusion are adequate.

(29) The steps taken and proposed by applicant to preserve aesthetic, historical, and recreational values satisfy the public interest standard embodied in Section 10(a) of the Federal Power Act.

(30) The water resources of the Village of Cornwall would be augmented and improved as a result of the project.

(31) Applicant proposes that lands of the Palisades Interstate Park Commission in the watershed behind Storm King Mountain will be augmented by approximately 100 acres.

(32) The Cornwall project is desirable and justified in the public interest for the purpose of developing the Hudson River for the use or benefit of interstate or foreign commerce. If the licensee cannot acquire by contract or pledge the properties required for the Cornwall project or

the right to use or damage the lands or properties of others necessary to the construction, maintenance or operation of the Cornwall project, including the project transmission line, it may acquire the same by the exercise of the right of eminent domain in the District Court of the United States for the Southern District of New York or in the courts of the State of New York.

(33) The construction of Applicant's proposed project at the Cornwall site will not constitute a hazard to the Catskill Aqueduct, and the site does not constitute a hazard to the Aqueduct.

(34) Construction of a bypass or a steel lining is, in fact, not necessary and need not be undertaken.

(35) The proposed alternative site 2 is a proper alternative location for Applicant's proposed project.

(36) Section 27 of the Federal Power Act does not preclude licensing this project without the consent of the City of New York.

(37) The proposed project offers more reliable, cleaner, and cheaper electricity than any other feasible alternative.

(38) The proposed project offers a superior and lower peaking energy cost than any other feasible alternative.

(39) Of all of the various alternatives considered, none are deemed a feasible alternative in that they are less satisfactory than Cornwall for one or more reasons, including poorer spinning reserve responses and load protection, greater contributions to air pollution, higher costs, lesser ability to meet power requirements, and greater environmental detriment.

(40) Cornwall makes the best uses of available resources to meet the requirements for electric energy with the minimum adverse impact on our environment.

(41) The project as now designed and modified by the accompanying Order is, in conformity with the policy set forth in the National Environmental Policy Act of 1969, compatible with the natural environment and will have no adverse effect on the ecology of the area.

(42) A hatchery for striped bass is feasible on the Hudson River and would be capable of enhancing the fishery.

The Commission orders:

(A) This license is issued to Con Ed (hereinafter referred to as the Licensee) under Section 4(e) of the Federal Power Act for a period of 50 years, effective as of the first day of the month in which acknowledgement of acceptance thereof is filed with the Commission by the Licensee, for the construction, operation, and maintenance of Project No. 2338, to be known as the Cornwall Pumped Storage Project, on the Hudson River, a navigable water of the United States, primarily in the Village of Cornwall and the Towns of Cornwall and Highlands, New York, and subject to the terms and conditions of the Act which is incorporated herein by reference as a part of this license, and subject to such rules and regulations as the Commission has issued or prescribed under the provisions of the Act.

(B) Proposed Project No. 2338 consists of:

(i) All lands constituting the project area and enclosed by the project boundary or the limits of which are otherwise defined, and/or interest in such lands

necessary or appropriate for the purposes of the project, whether such lands or interests therein are owned or held by the Licensee; the general location of such being shown and described by certain exhibits which formed part of the amended application for license filed May 31, 1966, and the hearing record, designated and described as follows:

Hearing Exhibit No.	
606	General Map—Plan 2
614	General Map—Plan 1
607	Site Plan—Plan 2
615	Site Plan—Plan 1
608	Plan—Plan 2
616	Plan—Plan 1
609	Cross Section—Plan 2
617	Cross Section—Plan 1
610	Plan Operating Floor—Plan 2
618	Plan Operating Floor—Plan 1
285	Tunnel Intake Sections
611	Tunnel and Intake Sections—Plan 2
286	Dike Sections

Exhibit	
M, as amended at Paragraphs (c) and (d) by Exh. 613	General Description and Specifications of Equipment and Appurtenances in three sheets

(ii) The location of the project designated and described in Hearing Exhibits 606, 607, 608, 609, 610, and 611, all referring to alternative Site 2, shall only become appropriate and applicable in the event that construction of the project at Site 1, described in Hearing

Exhibits 614, 615, 616, 617, 618, and 285 shall be precluded on a petition to review this Order. In such event, then this License is issued for alternative Site 2 in the same manner as otherwise provided for Site 1.

(iii) The Cornwall project will be a high head pumped-storage development located on the Hudson River approximately 40 miles north of New York City, in part of the Village of Cornwall and in part in the Towns of Cornwall and Highlands and in Orange, Putnam and Westchester Counties, New York. A portion of the tunnel and penstock manifold will occupy subsurface lands within the Palisades Interstate Park. The project will consist of an upper reservoir, a tunnel leading from the reservoir to a pumping generating station at the riverside housing reversible pump-turbine and motor-generation units and other auxiliary facilities, switching gear, and primary transmission lines. The units will generally act as motor-pumps using off-peak energy furnished from non-project steam-electric, nuclear, or other facilities to pump water from the Hudson River to the upper reservoir, and as generators to generate power during on peak hours by the flow of water from the reservoir back through the units to the river. This cycle of operation will be repeated daily when the plant is in operation and advantage of weekend storage will also be utilized. The plant will also be partially loaded, or spinning without water, as spinning reserve for the Licensee's and other loads in the area.

The reservoir will be created in the Hudson Highlands by forming a basin through the construction of five dikes, and will have available storage capacity of

about 25,000 acre-feet between elevations 1000 and 1160 feet. The dikes will be constructed so that they can be raised in the future to provide for a maximum water surface elevation of 1210 feet.

The reservoir fill and discharge will be accomplished by a concrete lined tunnel, through granite, 40 feet inside diameter and about 10,000 feet long, a concrete lined sub-surface manifold, and eight steel line penstocks reinforced to accommodate a maximum surface elevation in the upper reservoir of 1,210 feet. Water from the upper reservoir will be conveyed through the tunnel, thence through the manifold, and through the penstocks to the pumping-generating station.

The pumping-generating station will consist of an underground power house with eight pumping-generating units each capable of generating about 250 megawatts (total capability of about 2,000 mw) under a gross head of about 1,060 feet. When generating, the station will discharge between about 25,000 and 27,000 cfs, and when pumping, the station will draw between about 14,900 and 22,000 cfs. The transformation from motor-generator voltage of about 18 kilovolts to 345 kilovolts will be by transformers located at the station and delivered by switching gear and submarine cables across the river and thence by underground cable a distance of approximately 1.6 miles to the Cornwall East underground terminal point located on the east side of the Hudson River at Nelsonville.

The overhead transmission system will commence at the Cornwall East underground terminal point and will consist of a double circuit 345 kilowatt overhead transmission line extending about 9.2 miles to the Licensee's existing Pleasant Valley-Millwood-Sprain

Brook transmission right-of-way in the vicinity of Kent on the west side of the Taconic State Parkway and then, replacing an existing 138 kv transmission line, south via the Millwood substation about 22 miles to the Sprain Brook substation, together with an appropriate screened switching station in the vicinity of Kent to connect the double circuit 345 kv line from the Cornwall East underground terminal point to the double circuit 345 kv lines between Pleasant Valley and Sprain Brook.

(C) This license is also subject to the terms and conditions set forth in Form L-4 (revised June 1, 1964) entitled "Terms and Conditions of License for Unconstructed Project Affecting Navigable Waters of the United States" (32 FPC 839), which terms and conditions, designated as Article 1 through 29, are attached hereto and made a part hereof, and subject to the following special conditions set forth herein in additional articles:

Article 30. The Licensee shall install a water measuring weir below the dike which extends between Mt. Misery and Whitehorse Mountain and shall measure at least once each week during the first year of operations the seepage flow and turbidity, if any. The measurements shall be recorded, plotted, and reported to the Commission each three months period for the first year of operations and thereafter as requested by the Commission or its authorized representative.

Article 31. The Licensee shall employ three qualified independent consultants for the purpose of making recommendations as to the measures to be taken with respect to the foundations of the upper reservoir dikes, the general

reservoir area, and the final design and specifications for the dikes and to advise Licensee as to other protective measures. A report and recommendations of the consultants shall be submitted for Commission consideration when the Licensee files revised Exhibits J and L for Commission approval. The Commission reserves the right to require the Licensee to take appropriate measures to assure the water tightness of the upper reservoir and other protective measures deemed necessary for the project.

Article 32. The designs of the tunnel intake, and of the crest and toe of the dike facing Clove Creek, shall be based on hydaulic model studies, and the crest of this dike shall be at least three feet lower in elevation than the other dikes.

Article 33. The Licensee shall submit in accordance with the Commission's rules and regulations revised Exhibits J, L, M, and R showing the final designs of the project works and the Licensee shall not begin construction of the project structures until the Commission has approved such exhibits.

Article 34. The Licensee shall submit for Commission approval Exhibits F and K prepared in accordance with the Commission's Rules and Regulations, within two years from the effective date of this license.

Article 35. The Licensee—

(1) Shall design the overhead transmission facilities to have sufficient carrying capacity to accommodate not only the initial transmission of 2000 megawatts of power but also future transmission of 3000 megawatts of power if and when authorized;

(2) Shall locate the overhead transmission facilities between Cornwall East underground terminal point at Nelsonville and a point near Kent on its existing Pleasant Valley-Millwood transmission line corridor, on a new right-of-way not to exceed 125 feet in width, except at corners, transposition points, access points, or points of unusual character, along the following route:

(a) From Cornwall East underground terminal point at Nelsonville, northeasterly, paralleling New York State Route 301 to a point a short distance west of McKeel Corners in the Town of Philipstown;

(b) thence generally northeasterly following the valley of a stream which flows between East Mountain and Round Hill, to Wiccoppee Pass, said stream being located approximately one-half mile northwest of a reservoir located near Glynwood Farm;

(c) thence continuing northeasterly, staying northwest of Fahnestock State Park and Taconic State Parkway at least one-quarter mile, to a point on the existing Pleasant Valley-Millwood transmission line corridor northwest of the Taconic Parkway in the Town of Kent in Putnam County; the point of intersection would be approximately one mile north of Fahnestock Park in the Town of Kent in Putnam County, on Consolidated Edison's existing right-of-way between Pleasant Valley (Dutchess County) and Millwood, presently occupied by two tower lines;

(3) Shall locate the overhead transmission facilities between the aforementioned point on its existing Pleasant Valley-Millwood transmission line right-of-

way to the Millwood Substation by replacing the existing 138 kilovolt double circuit transmission line, where necessary, and widening the right-of-way only where necessary to accommodate corners, transposition points, access points, or points of unusual character, either along the west or east existing boundary so as to cause a minimum interference with the interests of local property owners and local communities in the Towns of Kent, Putnam Valley, Carmel, Yorktown, and New Castle;

(4) Shall locate the overhead transmission facilities between Millwood substation and Sprain Brook substation on the right-of-way of an existing transmission line of the Licensee; and

(5) Shall, in constructing and installing overhead transmission facilities, give appropriate consideration to recognized guidelines, including those contained in the Hudson River Valley Commission's "Power Lines and Scenic Values in the Hudson River Valley," for protecting the environment and to beneficial uses, including wildlife, of the transmission line right-of-way. These facilities shall, generally, traverse wooded and sparsely settled areas, and shall cross ridges, where possible, through valleys and draws so as to minimize the silhouette of the transmission line towers against the sky as viewed from highways and scenic vantage points. The transmission tower exteriors shall be treated to blend insofar as practical into the landscape and the right-of-way replanted after construction with native materials at road crossings and other points of major public view.

This Article shall not restrict the use of the existing Pleasant Valley-Sprain Brook transmission line right-of-way in any manner deemed necessary for the marketing of Cornwall and other power.

Article 36. The Licensee—

(1) Shall within six months following issuance of license and after consultation with the United States Fish and Wildlife Service, the Fish and Game Division of the New York Conservation Department, and the Fish and Game Division of the New Jersey Department of Conservation and Economic Development, submit to the Commission for approval, a biological and engineering study program, which it will make or pay the cost of making in the interest of protecting and developing the fishery resources of the Hudson River as may be affected by the project, to include consideration of the populations of fish inhabiting the vicinity of or migrating past the project site and their behavior and physical abilities; and artificial propagation facilities and operations needed to offset any losses to fish populations, including pilot hatchery studies. The Commission reserves the right to modify the study program upon its own motion or upon recommendation of the U. S. Fish and Wildlife Service and the New York and New Jersey State conservation agencies.

(2) Shall construct, operate and maintain or provide for the construction, operation and maintenance of the fish protective facilities generally as shown in Sketch 141 "Fish Screens and Bridge" (Hearing Exhibit 296); *Provided* that during the first three years of opera-

tion of the project, licensee shall make or pay the cost of making studies to assess fully the effect of project operation on the fish populations and their habitat. A proposal for post-construction studies shall, following consultation with the agencies, referred to herein, be submitted to the Commission for approval no later than one year prior to completion of the project.

(3) Shall make any needed modifications of the fish protective facilities, as may be ordered by the Commission, after notice and opportunity for hearing, on its own motion or upon recommendations by the United States Fish and Wildlife Service and the New York and New Jersey conservation agencies.

(4) Shall file progress reports with the Commission on the results of the studies as required under (1), (2) and (3) of this article. If the Licensee, the United States Fish and Wildlife Service, the New York and New Jersey conservation agencies, are unable to agree upon the scope, objectives, timing and manner of performance of the studies herein ordered, the matter shall be submitted to the Commission for determination.

Article 37. The Licensee shall construct and maintain or provide for the construction and receive assurances for the maintenance for public use of the recreational facilities, generally as shown in Exhibit R (Hearing Exhibits 240 and 241) except that the Licensee shall not construct the visitors' information center, aboveground facilities for visitors, picnic area, picnic shelter, parking spaces for visitors and access roads for the visitors' information center, picnic shelter and picnic area, all as generally described and

shown on pages 2 and 3 of Exhibit 240 and pages 24 and 25 of Exhibit 241. The recreational plan shall include a public boat launching facility for the riverfront park described in Exhibit R.

Article 38. Licensee shall minimize any disturbance caused by construction and maintenance of the project works to the scenic values of the area by implementing a plan for screen and other plantings, artificial treatment of rock at the portals and of shoreline and tailrace structures and such other treatment as may be reasonably needed to preserve and promote the scenic values of the powerhouse and tailrace in conformity with the planting plans set forth in Exhibits 476 and 637. The planting plan set forth in Exhibit 637 shall, however, be applicable only in the event that location of the powerhouse is precluded at Site 1.

Article 39. The Licensee shall pay to the United States the following annual charge:

> For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations in effect from time to time. As herein authorized, the installed capability for such purposes is 2,667,000 horsepower.

(D) The exhibits designated and described in paragraph (B) above are hereby approved as part of the license herein issued to the extent therein indicated.

(E) The exceptions to the examiner's decision, except as herein granted, are denied. The examiner's decision, to the

extent not inconsistent herewith, is adopted as part of this Opinion and Order.

(F) No expansion of the Cornwall Pumped Storage Project beyond the presently licensed maximum peak generating capacity of 2,000,000 kilowatts shall be authorized without the issuance of a public notice of such proposed increase and the granting of an opportunity for hearing thereon.

(G) This order shall become final thirty (30) days from the date of its issuance unless application for rehearing shall be filed as provided by Section 313(a) of the Act, and failure by Licensee to file such an application shall constitute acceptance of this license. In acknowledgment of the acceptance of this license, it shall be signed by the Licensee and returned to the Commission within sixty (60) days from the date of issuance of this order.

By the Commission.

(SEAL)

KENNETH F. PLUMB,
Acting Secretary.

APPENDIX C

35676-78, 35683 & 35688-9

UNITED STATES COURT OF APPEALS

SECOND CIRCUIT

SCENIC HUDSON PRESERVATION CONFERENCE, *et al.*,

Petitioners,

v.

FEDERAL POWER COMMISSION,

Respondent.

A petition for a rehearing having been filed herein by counsel for The City of New York,

Upon consideration thereof, it is

Ordered that said petition be and it hereby is denied.

HENRY J. FRIENDLY (P.R.H.)
PAUL R. HAYS

I dissent:

JAMES L. OAKES (P.R.H.)

November 26, 1971

35676-78, 35683 & 35688-9

UNITED STATES COURT OF APPEALS

SECOND CIRCUIT

SCENIC HUDSON PRESERVATION CONFERENCE, *et al.*,

Petitioners,

v.

FEDERAL POWER COMMISSION,

Respondent.

Petition for a rehearing containing a suggestion that the action be reheard in banc having been filed herein by counsel for Scenic Hudson Preservation Conference, the Sierra Club and its Atlantic Chapter, the Izaak Walton League of America, National Audubon Society and National Parks and Conservation Ass'n, The City of New York, and the Wilderness Society, a poll of all the active circuit judges having been taken, and a majority for rehearing in banc not having been obtained, it is ordered that said petition be and it hereby is denied. Judges Hays, Mansfield, Oakes and Timbers voted for in banc consideration.

HENRY J. FRIENDLY
Chief Judge

November 26, 1971.

Scenic Hudson v. FPC
(On Petition for Rehearing En Banc)

TIMBERS, *Circuit Judge,* dissenting:

I dissent from the denial of reconsideration *en banc.*

Aside from the fact that four of the eight active judges of this Court (including two members of the panel who heard and decided the case originally) have voted in favor of *en banc* reconsideration, it does seem to me that a substantial question of unusual importance is presented by the panel's application of the substantial evidence test in reviewing the FPC's determination that the benefits of the project outweigh the environmental damages.

APPENDIX D

16 United States Code

§ 821. State laws and water rights unaffected

Nothing contained in this chapter shall be construed as affecting or intending to affect or in any way to interfere with the laws of the respective States relating to the control, appropriation, use, or distribution of water used in irrigation or for municipal or other uses, or any vested right acquired therein. June 10, 1920, c. 285, § 27, 41 Stat. 1077.

42 United States Code

§ 4331. Congressional declaration of national environmental policy.

(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and na-

ture can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this chapter, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

(c) The Congress recognizes that each person should enjoy a healthful environment and that each person has

a responsibility to contribute to the preservation and enhancement of the environment. (Pub. L. 91-190, title I, § 101, Jan. 1, 1970, 83 Stat. 852.)

§ 4332. Cooperation of agencies; reports; availability of information; recommendations; international and national coordination of efforts.

The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter, and (2) all agencies of the Federal Government shall—

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;

(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by subchapter II of this chapter, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of Title 5, and shall accompany the proposal through the existing agency review processes;

(D) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(E) recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation

in anticipating and preventing a decline in the quality of mankind's world environment;

(F) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

(G) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(H) assist the Council on Environmental Quality established by subchapter II of this chapter.

(Pub. L. 91-190, title I, § 102, Jan. 1, 1970, 83 Stat. 853.)

IN THE

Supreme Court of the United States

OCTOBER TERM, 1971

APR 26 1972

No. 71-1219

SCENIC HUDSON PRESERVATION CONFERENCE, *et al.*,
Petitioners,

—v.—

FEDERAL POWER COMMISSION,
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., *et al.*,
Respondents.

No. 71-1220

THE CITY OF NEW YORK,
Petitioner,

—v.—

FEDERAL POWER COMMISSION,
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., *et al.*,
Respondents.

No. 71-1221

THE SIERRA CLUB AND ITS ATLANTIC CHAPTER,
Petitioners,

—v.—

FEDERAL POWER COMMISSION,
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., *et al.*,
Respondents.

BRIEF OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., IN OPPOSITION TO PETITIONS FOR A WRIT OF CERTIORARI

CAMERON F. MACRAE
Attorney for Respondent

LEBOEUF, LAMB, LEIBY & MACRAE
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Dated: April 25, 1972

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